

Asthma in New Hampshire, 1990-2001

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EXECUTIVE SUMMARY

- According to data from the 2001 BRFSS, 12.5% of adults in New Hampshire had been told they had asthma at some time in their life.
- The prevalence of current asthma among adults in New Hampshire was 8.4% in 2001. 10.0% of females had current asthma compared to 6.8% of males.
- There were 796 asthma-related hospitalizations of New Hampshire residents in 2000, a rate of 6.5 per 10,000 people. These hospitalizations resulted in 2,436 days spent in the hospital and total charges of approximately 4.1 million dollars.
- In 2000, the median charge per asthma hospitalization was \$4,095 and the average length of stay was 3.1 days.
- Children less than 5 years of age and adults 75 years or older had the highest rates of hospitalization for asthma in 2000.
- The hospitalization rate among children in New Hampshire has declined in recent years, from 18.6 per 10,000 in 1996 to 10.8 per 10,000 in 2000.
- The hospitalization rate among females in 2000 was 8.5 per 10,000, compared to 4.3 per 10,000 among males. Female rates were higher than male rates from 1996 to 2000.
- The likelihood of hospitalization for asthma varies by both age and gender. Males aged 0 to 14 have higher hospitalization rates than females; after age 14, females have higher rates.
- The number of hospitalizations for asthma in New Hampshire varies by season of the year. In 2000, there were 102 asthma hospitalizations in January compared to 28 in July.
- There were 6,793 asthma-related emergency department visits by New Hampshire residents in 2000, a rate of 55.6 per 10,000 people. These visits resulted in approximately 3.3 million dollars in total charges. The median charge per visit was \$358.
- The rate of asthma-related emergency department visits among New Hampshire females was 65.2 per 10,000 compared to 44.4 per 10,000 among New Hampshire males in 2000.
- New Hampshire residents aged 15 to 24 had the highest rate of asthma-related emergency department visits in 2000.
- Private insurance was the primary source of payment for about half of all hospitalization and emergency department charges in 2000. Medicaid and Medicare accounted for about 40% of hospitalization charges and 30% of emergency department charges.
- There were 18 deaths of New Hampshire residents from asthma in 2000, 14 among females. Approximately 68% of asthma deaths from 1990-2000 were among females.

INTRODUCTION

Asthma is a chronic respiratory disease characterized by reversible obstruction of the airways, airway inflammation, and airway hyper-responsiveness to a variety of stimuli. Nationally, asthma is the most common chronic disease of childhood and the fourth leading cause of disability in children.¹ The prevalence of self-reported asthma during the preceding 12 months in the United States increased almost 74% in the past two decades, from 31.4 per 1,000 in 1980 to 54.6 per 1,000 in 1996 (when the National Health Interview Survey changed its questions on asthma).² According to data from the 2000 Behavioral Risk Factor Surveillance System (BRFSS), more than 21 million adults in the United States reported they have had asthma during their lifetime. At least 14 million of these adults reported that they still had asthma.³

Due to the large number of people affected, asthma results in considerable economic and social burden on the population. The burden of disease is not evenly distributed across geographic regions or population subgroups: women, children, African-Americans, and residents of urban areas are disproportionately affected by asthma. In 1998, asthma accounted for an estimated 12.7 billion dollars in expenditures in the US. The estimated total cost of asthma in New Hampshire in 1998 was 46 million dollars.⁴

Most of the morbidity and mortality from asthma can be prevented if the disease is managed according to established guidelines. Effective management includes control of exposure to factors that trigger exacerbations, adequate pharmacological management, ongoing monitoring of the disease, and patient education.⁵

In October 2001, the Centers for Disease Control and Prevention awarded a three-year planning grant to the New Hampshire Department of Health and Human Services to establish an Asthma Control Program. The program concentrates on asthma prevention and control from a public health perspective. The goals for this program are to:

- Build infrastructure within the state health department to address asthma
- Develop an asthma surveillance system to guide efforts and monitor progress
- Establish a statewide advisory council and convene a planning process to develop a comprehensive asthma action plan
- Begin implementing activities from the action plan

This document is the first annual compilation of data on asthma in New Hampshire. The report is organized into four major sections:

- 1) Adult prevalence data for 2000-2001 from the New Hampshire Behavioral Risk Factor Surveillance System (BRFSS)
- 2) Hospitalization data for 1996-2000 from the New Hampshire Inpatient Hospital Discharge data set
- 3) Emergency department visit data for 1996-2000 from the New Hampshire Outpatient Hospital Discharge data set
- 4) Mortality data for 1990-2000 from the New Hampshire Bureau of Vital Records

The data may be used to document the magnitude of the public health problem, assess trends over time, detect changes in health care practices, evaluate control strategies, and facilitate planning.

FREQUENTLY ASKED QUESTIONS

Why are data not presented by race or ethnicity?

Based on the 2000 United States Census, New Hampshire's population is approximately 96.0% white, 1.3% Asian, 0.7% African American, 0.2% American Indian, and 0.6% persons reporting some other race. About 1.7% of the population is of Hispanic or Latino origin. Because no single racial or ethnic minority group exceeds 1.7% of the total population, the number of asthma-related events in these groups is too small to allow for meaningful analysis. As the state's demographics change and as data collection techniques improve, it may be possible to present data on racial and ethnic minorities in the future.

I would like to see data for town, but cannot find this information in the report. Why doesn't this report show town-level data?

New Hampshire has a relatively small population of 1.2 million people divided among 234 cities and towns. In a given year, the number of hospitalizations or deaths due to asthma is too small to generate meaningful results on a town level.

I am interested in looking at asthma mortality rates by year, but this report includes only 3-year rates. Why?

Only a small number of deaths from asthma occur in New Hampshire each year. Rates need to be calculated with at least 20 events in the numerator. Calculating a rate based on less than 20 events in the numerator creates an unstable estimate that is not statistically reliable and varies greatly from year to year by chance alone. For this reason, three years of data are aggregated to create more stable rates for asthma mortality.

Some of the information in the report is identified as "age-adjusted". What does this mean and why is it done?

To compare populations where the distribution of age groups is different, an adjustment needs to be made. For example, the rate of asthma in New Hampshire may appear higher than that of the United States. However, this may be due to New Hampshire having a greater proportion of older people than the United States. By age-adjusting the New Hampshire data using the 2000 United States standard population, rates can be compared without concern about differences in the age distribution of the two populations.

This report summarizes data from 1990-2001, but it is now 2003. Why is there such a long time between data acquisition and publication?

New Hampshire Vital Statistics and Hospital Discharge data are available approximately 18-24 months after the close of the calendar year. For example, data for 2000 became available mid-2002. BRFSS data is generally available 6-8 months after the close of the calendar year. A second asthma report containing updated information from these sources will be released in early 2004.

What does the 95% confidence interval mean?

A 95% confidence interval is reported around many statistics, especially those for asthma prevalence from the Behavioral Risk Factor Surveillance System. Since only a sample of New Hampshire residents are interviewed for the BRFSS, the exact frequency of asthma in the entire population is unknown. As a result, the population frequency is estimated using the information from the sample. The 95% confidence interval represents the range of values that, with 95% certainty, includes the true value for the entire population. For example, 12.5% of adults in New Hampshire reported they had ever been diagnosed with asthma. The 95% confidence interval was 11.3%-13.7%. This can be interpreted to mean that our best estimate is that 12.5% of persons have ever been diagnosed with asthma, but that the true value could actually be as low as 11.3% or as high as 13.7%. In other words, the estimate from the survey has a margin of error of $\pm 1.2\%$.

How do I know if differences are statistically significant?

The confidence interval can be used to evaluate the statistical significance between two rates. If the interval for one rate does not overlap the interval for another, it is very likely that the difference between the groups is statistically significant. If the confidence intervals do overlap, the survey did not detect a statistically significant difference between the groups being compared. This could mean that no difference actually exists between the groups, or it could mean that a difference does exist but was not detected due to insufficient sample size.

What are the Centers for Disease Control and Prevention?

The Centers for Disease Control and Prevention (CDC) is part of the United States Department of Health and Human Services. The mission of the CDC is to promote health and quality of life by preventing and controlling disease, injury, and disability. The National Asthma Control Program, which is part of CDC's Air Pollution and Respiratory Health Branch, provides funds and guidance to many states for their asthma control efforts. In October 2001, New Hampshire received funding from the CDC to establish an asthma control program in the state.

Where can I get more information on asthma prevention, treatment, and research?

The National Asthma Control Program website is a good general resource for asthma and can be found at: <http://www.cdc.gov/nceh/airpollution/asthma/default.htm>. Detailed information on asthma and other lung diseases is available from the National Heart, Lung, and Blood Institute (NHLBI) at <http://www.nhlbi.nih.gov/health/public/lung/index.htm>, or the American Lung Association at <http://www.lungusa.org>. The New Hampshire chapter of the American Lung Association can be reached at 1-800-LUNG-USA or <http://www.lungusa.org/newhampshire/>. The New Hampshire Asthma Control Program can be reached at: 1-800-852-3345 ext. 0854 or <http://www.dhhs.state.nh.us/DHHS/ASTHMACONTROL/default.htm>.

METHODS

The data sources used for asthma surveillance in New Hampshire are based on the recommendations of national organizations such as the Centers for Disease Control and Prevention (CDC) and the Council of State and Territorial Epidemiologists (CSTE). Measures for asthma mortality and inpatient hospitalization are from *Indicators For Chronic Disease Surveillance*⁶, which was developed jointly by CSTE, the Association of State and Territorial Chronic Disease Program Directors, and the CDC. Measures for asthma emergency department visits and asthma prevalence are from CDC guidelines on the core elements of an asthma surveillance system. New Hampshire asthma surveillance data were analyzed using standard demographic breakdowns developed by these organizations in order to facilitate comparisons with national data.

National Comparisons

In this report, New Hampshire rates are compared to rates for the US white population rather than to overall US rates due to the relatively small minority population in the state. Where appropriate, asthma-related objectives from *Healthy People 2010* or *Healthy New Hampshire 2010* are presented to put current asthma data from New Hampshire in perspective.

Age-Adjustment of Rates

In some tables, both crude rates and age-adjusted rates are presented. The crude rate is calculated by dividing the number of events by the state's population. Because the events of interest (e.g., hospitalizations and deaths) are more common as a person ages, the crude rate can be affected by the age-structure of a population. To control for the effect of age, rates were adjusted using the direct method and the 2000 United States standard population. The age-adjusted rate allows for more meaningful analysis when comparing data between states or when looking at trends in a single state over time.

Numerators for Rate Calculations

Numerators for rate calculations included New Hampshire residents only; residents of other states who were hospitalized or died in New Hampshire were excluded. New Hampshire hospital discharge data do not include out-of-state hospitalizations or emergency department visits of New Hampshire residents. New Hampshire vital statistics data include resident deaths that occur in other states.

Denominators for Rate Calculations

New Hampshire population estimates from the 2000 US Census were used as denominators for rate calculations. Intercensal population estimates were extrapolated by taking the difference between the 1990 and 2000 population estimates, dividing it by ten to obtain a yearly increment, and adding multiples of this amount to the 1990 population to obtain estimates for 1991-1999.

Survey Data

95% Confidence Intervals (95% CI) are presented when data are obtained from surveys, reflecting the degree of uncertainty for each estimate. Since surveys such as the BRFSS contact only a sample of the population, data from the sample are weighted according to census estimates so that the results are more representative of the entire population. BRFSS data in New Hampshire are weighted to reflect US Census parameters of gender and age, and to account for selection probability. Selection probability is a factor when adults live in households served by more than one phone number, or when they live in multi-adult households. The percentages and confidence intervals presented throughout this report reflect the results of the survey after the application of the weighting formula.

DATA SOURCES

Behavioral Risk Factor Surveillance System

The Behavioral Risk Factor Surveillance System (BRFSS) is a population-based, random-digit dialed telephone survey of civilian, non-institutionalized adults, aged 18 years and older. The survey is coordinated by the Centers for Disease Control and Prevention (CDC) and is conducted annually by all 50 US states, three territories, and the District of Columbia. New Hampshire has participated in the BRFSS since 1987. The BRFSS includes questions on health and behavior risk factors such as safety belt use, diet, weight control, asthma, alcohol use, physical exercise, and preventive health screenings.

A core set of questions, which has included adult asthma prevalence, is asked annually. Additional questions on asthma are asked in optional sections on adult asthma history and childhood asthma. The data are weighted to more accurately reflect the population by accounting for age, gender, and probability of selection. The national estimates provided were not calculated by pooling all BRFSS data as a sample of the nation as a whole; they were simply a calculation of the middle value of all the state estimates (the median). This method gives equal weight to smaller states and bigger states and cannot be relied upon to approximate a national sample. This report contains data on asthma from the 2000 and 2001 New Hampshire BRFSS. 4,068 interviews were completed in the 2001 survey. New Hampshire and national data can be accessed on-line at: <http://www.cdc.gov/brfss/>. Additional information on the New Hampshire BRFSS is available from the Bureau of Health Statistics and Data Management at: <http://www.dhhs.state.nh.us/DHHS/BHSDM/default.htm>.

Inpatient Hospital Discharge Data

Data on all New Hampshire hospitalizations are abstracted from medical records upon patient discharge and submitted electronically to the New Hampshire Hospital Association, which is under contract with the Department of Health and Human Services to collect the data. The inpatient data set contains discharge records on admissions for stays of 24 hours or more at all 23 acute-care, non-federal, inpatient facilities in the state. The Bureau of Health Statistics and Data Management oversees this data set. Hospitalization data are coded under the Ninth Revision of the International Classification of Diseases-Clinical Modification (ICD-9-CM). This report contains data on asthma inpatient hospitalizations from 1996-2000. Additional information about New Hampshire hospital discharge data is available on-line at: <http://www.dhhs.state.nh.us/DHHS/BHSDM/Hospital-Discharge-Data.htm>.

Outpatient Hospital Discharge Data

The outpatient data set contains discharge records for hospital emergency department visits, observation stays in the emergency department after illness or injury, and hospital visits for scheduled ambulatory surgeries. The Bureau of Health Statistics and Data Management also oversees this data set. Outpatient data are coded under ICD-9-CM. This report contains data on asthma outpatient hospital visits from 1996-2000. Additional information about New Hampshire outpatient hospital discharge data is available on-line at: <http://www.dhhs.state.nh.us/DHHS/BHSDM/Hospital-Discharge-Data.htm>.

Vital Statistics

New Hampshire law requires that reports of all birth, death, fetal death, marriage, and divorce be filed with the office of the State Registrar at the New Hampshire Department of Health and Human Services, Bureau of Vital Records. The Bureau of Health Statistics and Data Management maintains and analyzes these data. Depending on the event, filings are made by hospital personnel, physicians, funeral directors, city/town clerks, attorneys, and clerks of the courts. Reports of New Hampshire resident births and deaths in other states, and Canada, are provided to the State Registrar, for statistical purposes only, under an inter-state/Canadian agreement for the exchange of vital events information. The 1998 New Hampshire Vital Statistics Report may be accessed on-line at:

<http://www.dhhs.state.nh.us/dhhs/bhsdm/library/default.htm>.

The cause of death reported on a death certificate is the underlying cause of death. In a death record, the underlying cause of death is the specific disease, condition, or injury that initiated the chain of events leading to death. The underlying cause of death is not always the same as the immediate cause of death. For example, if a person was hospitalized for asthma, but developed pneumonia and died while in the hospital, the underlying cause of death would be asthma.

Deaths are coded based on the applicable revision of the International Classification of Diseases (ICD). From 1979-1998, deaths were coded under ICD Revision 9. In 1999, deaths began to be coded under ICD Revision 10. The National Center for Health Statistics reports a comparability ratio of 0.8938 for the coding of asthma mortality under ICD-10 as compared to ICD-9. This means that approximately 11 percent fewer deaths will be classified with asthma as the underlying cause under ICD-10 than under ICD-9. This report contains data on asthma mortality from 1990-2000. Additional information on deaths in New Hampshire is available at:

<http://www.dhhs.state.nh.us/DHHS/BHSDM/Death+Data.htm>.

Healthy People 2010

Healthy People 2010 is a set of national health targets for the next decade. It builds on initiatives pursued over the past two decades including the 1979 Surgeon General's Report, *Healthy People*, and *Healthy People 2000: National Health Promotion and Disease Prevention Objectives*. It is designed to achieve two overarching goals: 1) increase quality and years of healthy life, and 2) eliminate health disparities. Eight Healthy People 2010 objectives address asthma (see Appendix C). A copy of Healthy People 2010 can be obtained on-line at:

<http://www.health.gov/healthypeople/>.

Healthy New Hampshire 2010

Healthy New Hampshire 2010 is New Hampshire's health promotion and disease prevention agenda for the first decade of the 21st century. Similar to Healthy People 2010, it is a compilation of health objectives for the next decade. Healthy New Hampshire 2010 has one asthma-related objective: to reduce pediatric hospitalizations for asthma (see Appendix C). A copy of Healthy New Hampshire 2010 can be obtained on-line at:

<http://www.healthynh2010.org/>.

ASTHMA PREVALENCE

Prevalence data is an important component of asthma surveillance because it provides information on how many people have asthma and helps characterize the population with asthma in terms of age, sex, and other demographic factors. This type of information can provide an indication of the burden of asthma on the population and identify groups that may be disproportionately affected by the disease. Prevalence data can also be used to examine trends in the occurrence of asthma over time. These data may underestimate the burden of asthma in the population, however, because they capture only those individuals who have been diagnosed with asthma by a doctor or other health professional. Due to the fact that asthma is a chronic and variable disease that often has a slow onset, it may remain undiagnosed for years in some individuals.

The Behavioral Risk Factor Surveillance System (BRFSS) is a population-based telephone survey of adults aged 18 and older that is coordinated by the Centers for Disease Control and Prevention. It is designed to monitor the prevalence of the major behavioral health risks associated with premature morbidity and mortality. New Hampshire has participated in the BRFSS since 1987. In 2000, two asthma questions were added to the BRFSS core survey in an effort to systematically collect data on adult asthma prevalence in all participating states and territories. Results from these two questions provide information on lifetime asthma prevalence and current asthma prevalence among adults. According to data from the 2000 BRFSS, more than 21 million adults in the United States have had asthma during their lifetime. At least 14 million of these adults reported that they still had asthma.⁷

This section presents data from the 2001 New Hampshire BRFSS. It includes information on lifetime and current asthma prevalence among adults in the state, and the percentage of adults who reported having a child with asthma. Data were analyzed by age, sex, education, and income groups whenever possible to determine whether asthma prevalence varied by these demographic factors. In addition, factors such as general health status, number of poor health days, weight, and smoking status were compared among adults with and without current asthma.

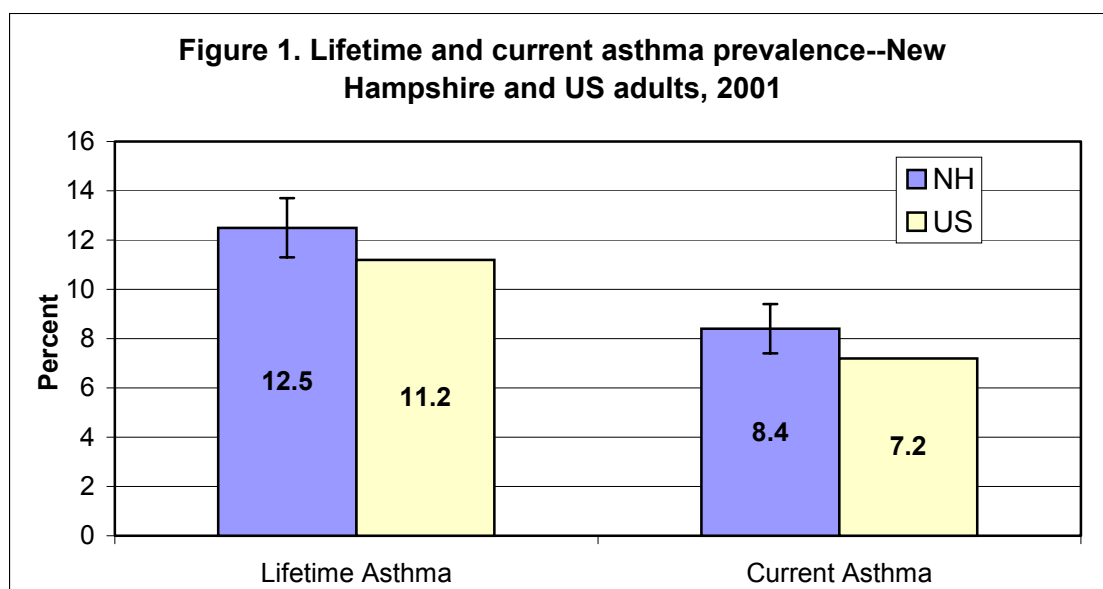
Lifetime asthma refers to the number of people who answered yes to the question “Have you ever been told by a doctor that you had asthma?” The lifetime asthma prevalence rate is calculated by dividing the number of people who report lifetime asthma by the number of people who complete the survey. Current asthma refers to the number of people who answered yes to two questions: “Have you ever been told by a doctor that you had asthma?” and “Do you still have asthma?” The current asthma prevalence rate is calculated by dividing the number of people who report current asthma by the number of people who complete the survey. Denominators used in all prevalence calculations excluded “Don’t Know/Not Sure” and “Refused” responses.

A list of asthma questions used in the 2000 and 2001 New Hampshire BRFSS surveys can be found in Appendix B.

ASTHMA IN ADULTS

Table 1. Lifetime and current asthma prevalence—New Hampshire and US adults, 2001

	Lifetime Asthma Percent (95% CI)	Current Asthma Percent (95% CI)
New Hampshire	12.5 (11.3, 13.7)	8.4 (7.4, 9.4)
United States (median)	11.2	7.2

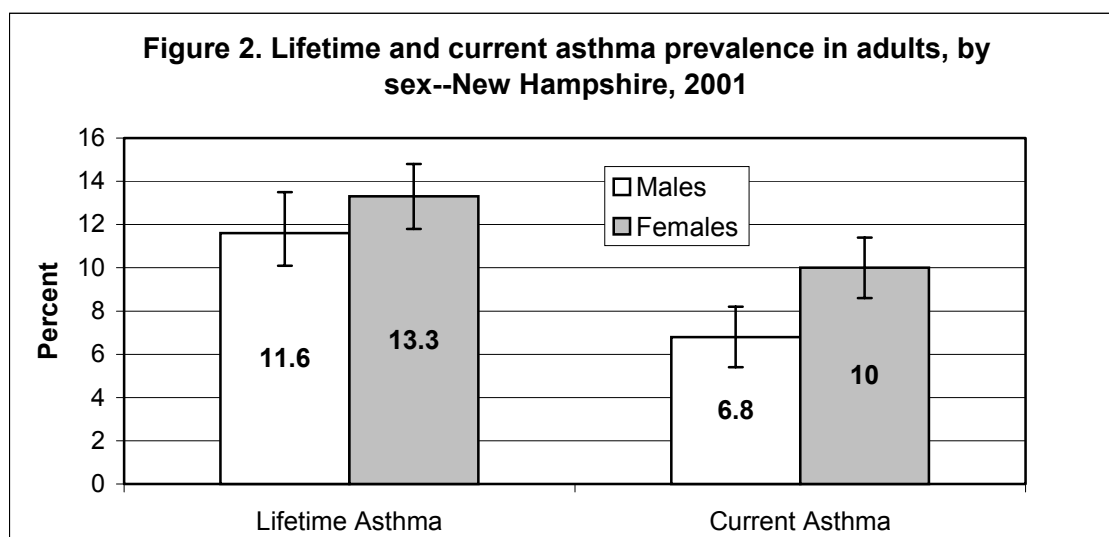


Comment: Overall, 12.5% of New Hampshire adults have been told they had asthma at some time in their life. 69.5% of these adults reported that they still had asthma in 2001. The current asthma prevalence rate among New Hampshire adults in 2001 was 8.4%. 2001 lifetime and current asthma prevalence estimates were slightly higher than 2000 estimates, although the increase was not significant. (See Appendix A)

The median of lifetime asthma prevalence estimates for all US states in 2001 was 11.2% (range: 7.5-19.6) according to the BRFSS. Both lifetime and current asthma prevalence rates in New Hampshire were higher than the national median estimates in 2001.

**Table 2. Prevalence of lifetime and current asthma in adults, by sex—
New Hampshire, 2001**

Sex	Lifetime Asthma		Current Asthma	
	Percent	95% CI	Percent	95% CI
Males	11.6	(9.7, 13.4)	6.8	(5.4, 8.2)
Females	13.3	(11.8, 14.9)	10.0	(8.6, 11.4)
Total	12.5	(11.3, 13.7)	8.4	(7.4, 9.4)

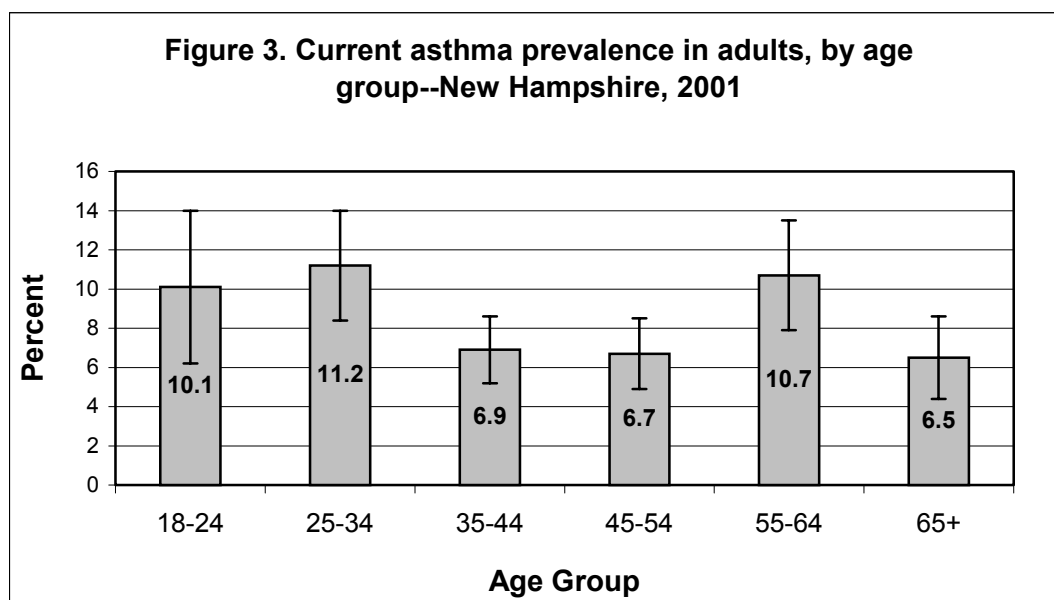


Comment: In 2001, 13.3% of adult females and 11.6% of adult males in New Hampshire had been told they had asthma at some time in their life. There was no statistically significant difference in lifetime asthma prevalence according to gender.

Among those adults who reported lifetime asthma, 59.9% of males and 77.4% of females said they still had asthma in 2001. The current asthma prevalence rate was 6.8% for New Hampshire males and 10.0% for New Hampshire females. The difference in current asthma prevalence according to gender was significant.

Table 3. Prevalence of lifetime and current asthma in adults, by age group--New Hampshire, 2001

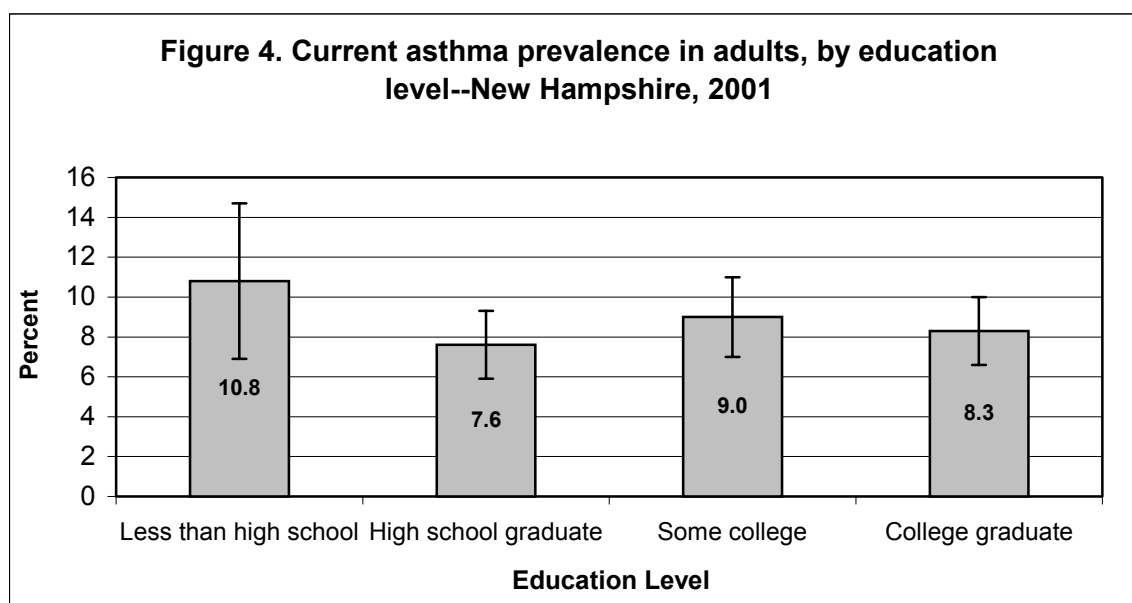
Age Group	Lifetime Asthma		Current Asthma	
	Percent	95% CI	Percent	95% CI
18 to 24	17.7	(12.7, 22.7)	10.1	(6.2, 14.1)
25 to 34	17.2	(13.9, 20.6)	11.2	(8.4, 14.0)
35 to 44	10.4	(8.3, 12.5)	6.9	(5.2, 8.6)
45 to 54	9.5	(7.3, 11.7)	6.7	(4.9, 8.6)
55 to 64	14.0	(10.9, 17.2)	10.7	(7.9, 13.5)
65 and older	8.0	(5.8, 10.2)	6.5	(4.4, 8.5)
Total	12.5	(11.3, 13.7)	8.4	(7.4, 9.4)



Comment: Lifetime asthma among adults aged 25-34 was significantly higher than the statewide estimate of 12.5%. There were no statistically significant differences in current asthma between age groups or between each age group and the statewide estimate.

**Table 4. Prevalence of lifetime and current asthma in adults, by education level--
New Hampshire, 2001**

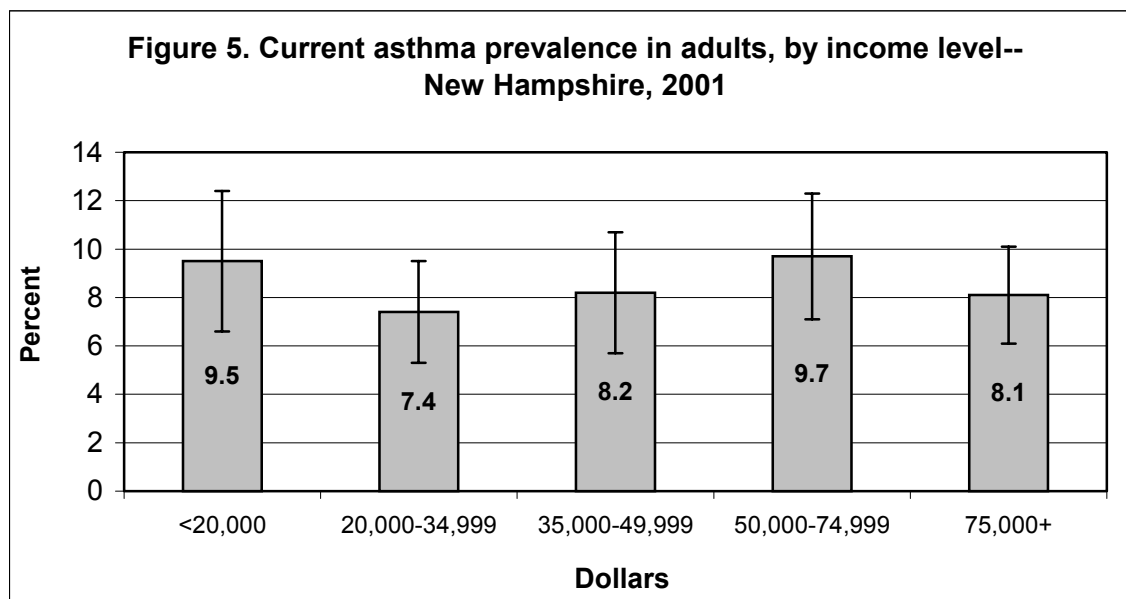
Education Level	Lifetime Asthma		Current Asthma	
	Percent	95% CI	Percent	95% CI
Less than high school	13.7	(8.9, 18.4)	10.8	(6.9, 14.6)
High school graduate/ GED	11.1	(9.1, 13.1)	7.6	(5.9, 9.3)
Some college	13.8	(11.2, 16.3)	9.0	(7.0, 11.0)
College graduate	12.5	(10.5, 14.5)	8.3	(6.6, 9.9)
Total	12.5	(11.3, 13.7)	8.4	(7.4, 9.4)



Comment: There were no statistically significant differences in lifetime asthma prevalence or current asthma prevalence according to education level in 2001.

Table 5. Prevalence of lifetime asthma in adults, by income level--New Hampshire, 2001

Income Level	Lifetime Asthma		Current Asthma	
	Percent	95% CI	Percent	95% CI
Less than \$20,000	12.0	(8.7, 15.3)	9.5	(6.6, 12.4)
\$20,000-\$34,999	11.7	(9.1, 14.3)	7.4	(5.3, 9.4)
\$35,000-\$49,999	11.3	(8.4, 14.2)	8.2	(5.7, 10.7)
\$50,000-\$74,999	14.7	(11.5, 17.9)	9.7	(7.1, 12.3)
\$75,000 and higher	12.9	(10.4, 15.4)	8.1	(6.1, 10.2)
Total	12.5	(11.3, 13.7)	8.4	(7.4, 9.4)



Comment: There were no statistically significant differences in lifetime or current asthma prevalence according to income level in 2001. Income refers to self-reported total annual household income.

The denominator used to calculate asthma prevalence excluded “Don’t Know/Not Sure” and “Refused” responses. 13.9% of survey respondents had missing data for income in 2001.

ASTHMA IN CHILDREN

**Table 6. Percentage of adults that had a child with asthma—
New Hampshire, 2001**

	Percent (95% CI)
Ever told child had asthma	17.5 (15.3, 19.6)
Child still has asthma	71.0 (64.6, 77.4)

Comment: Information on childhood asthma from the 2001 BRFSS is based on adult responses. Respondents who reported that at least one child 17 or younger lived in their household were asked “How many of these children have ever been diagnosed with asthma?” Adults who reported that at least one of the children in the household had been diagnosed with asthma were then asked “How many of these children still have asthma?”

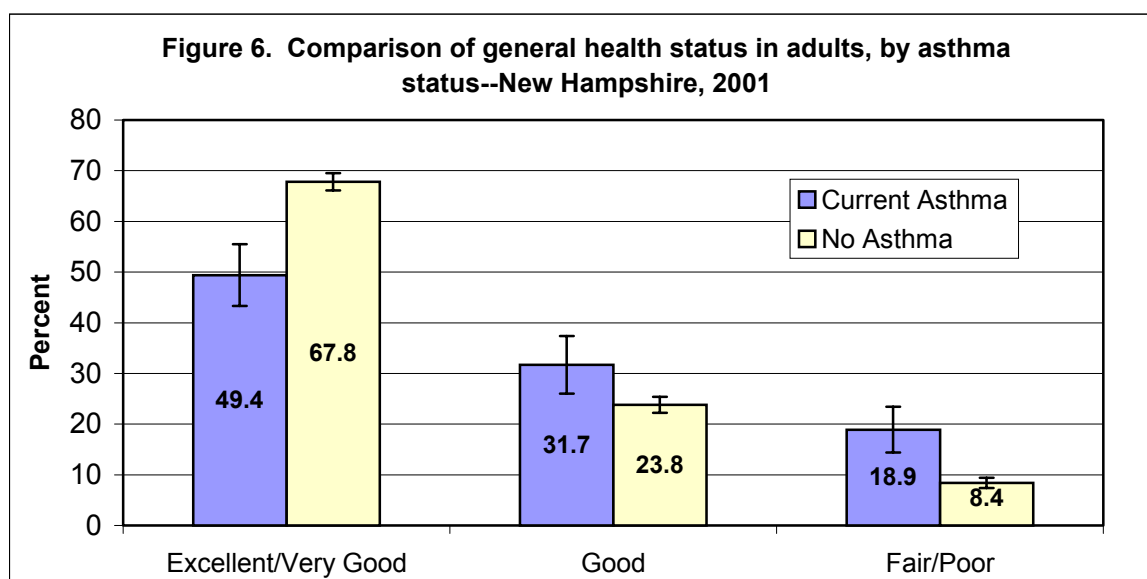
In 2001, 17.5% (95% CI: 15.3-19.6) of New Hampshire adults had a child in their household who had been diagnosed with asthma. There were no differences in the percentage of people who had a child in their household diagnosed with asthma among income or education groups. (See Appendix A, Table 3). Seventy-one percent (95% CI: 64.6-77.4) of people who reported that they had a child in their household diagnosed with asthma said the child still had asthma.

The Centers for Disease Control and Prevention and state BRFSS coordinators are currently developing weighting standards so that an estimate of childhood asthma prevalence can be generated from these data.

COMPARISONS AMONG ADULTS WITH AND WITHOUT CURRENT ASTHMA

Table 7. Comparison of general health status in adults, by asthma status—New Hampshire, 2001

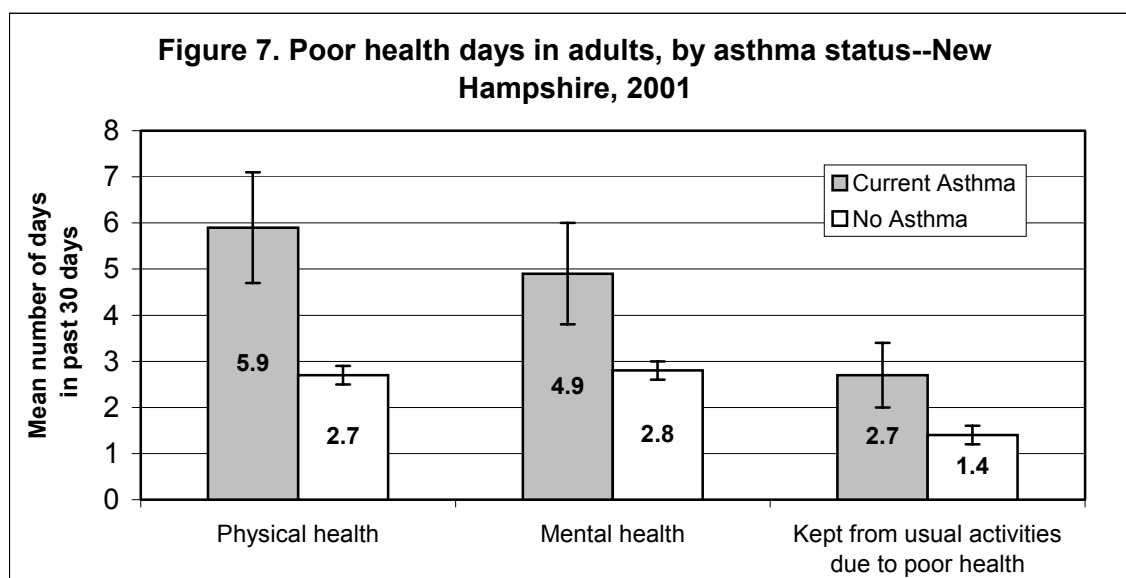
Asthma Status	Excellent/Very Good	Good	Fair/Poor
	N Percent (95% CI)	N Percent (95% CI)	N Percent (95% CI)
Current Asthma	157 49.4 (43.3, 55.6)	105 31.7 (26.0, 37.4)	75 18.9 (14.5, 23.3)
No Asthma	2461 67.8 (66.1, 69.4)	903 23.8 (22.2, 25.3)	341 8.5 (7.5, 9.5)



Comment: In the 2001 BRFSS survey, all adult respondents were asked to rate their general health as excellent, very good, good, fair, or poor. Approximately sixty-eight percent of New Hampshire adults who did not have asthma reported that their general health was excellent or very good, compared to just 49.4% of adults with asthma. Only 8.4% of adults who did not have asthma reported fair or poor health, versus 18.9% of adults with asthma. The difference between people with and without current asthma for each of the three categories of self-rated general health status was statistically significant. ($\chi^2=35.05$, $p<0.0001$).

Table 8. Comparison of mean number of poor health days in past 30 days, by asthma status—New Hampshire adults, 2001

	Physical Health	Mental Health	Kept from Usual Activities
	N	N	N
Asthma Status	Mean (95% CI)	Mean (95% CI)	Mean (95% CI)
Current Asthma	332 5.9 (4.7, 7.0)	329 4.9 (3.8, 5.9)	331 2.7 (2.0, 3.5)
No Asthma	3659 2.7 (2.5, 2.9)	3652 2.8 (2.6, 3.0)	3686 1.4 (1.2, 1.6)

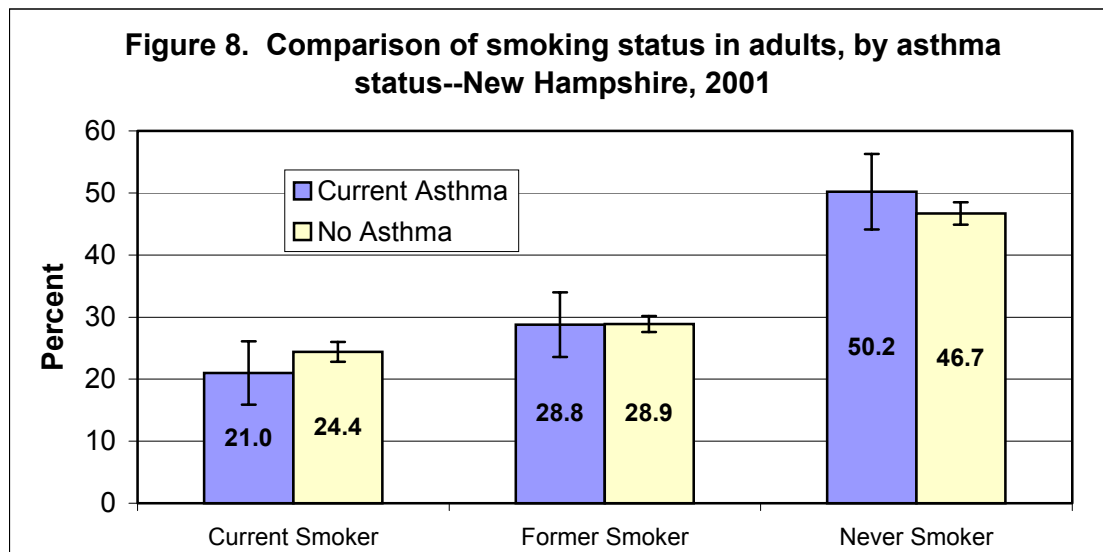


Comment: New Hampshire adults with current asthma reported significantly more days of poor physical and mental health in a month than adults with no asthma ($p < 0.001$ for both comparisons). Persons with asthma reported an average of 5.9 days of poor physical health and 4.9 days of poor mental health during the previous month. In contrast, persons with no asthma reported an average of 2.7 days of poor physical health and 2.8 days of poor mental health in the past month.

In addition, adults with current asthma reported significantly more days of activity limitations due to poor physical or mental health than persons with no asthma ($p < 0.001$). Respondents with current asthma reported they were kept from their usual activities due to poor health an average of 2.7 out of the previous 30 days; respondents with no asthma were kept from usual activities an average of 1.4 days.

Table 9. Comparison of smoking status in adults, by asthma status—New Hampshire, 2001

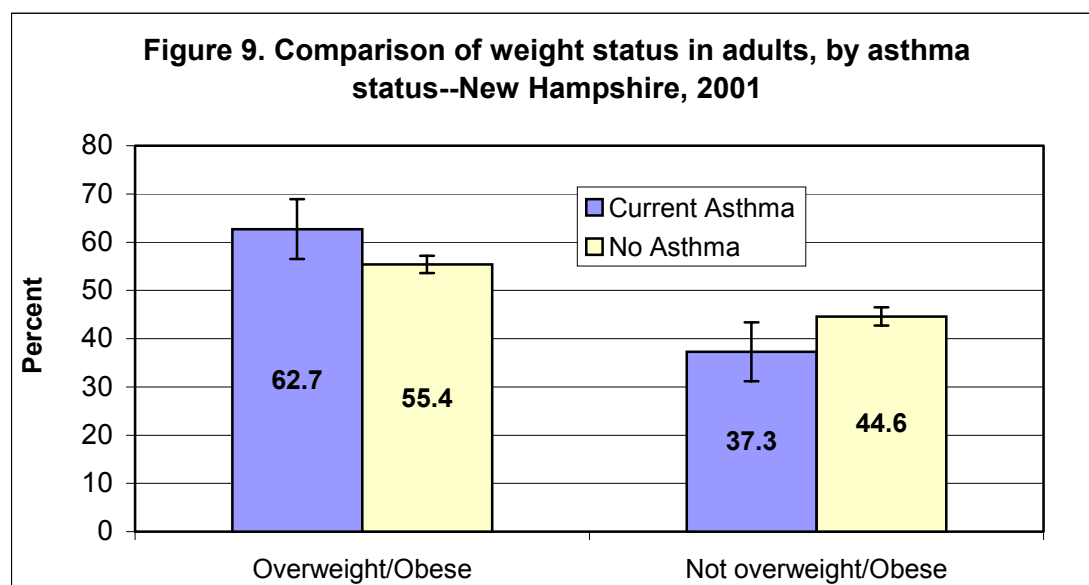
	Current Smoker	Former Smoker	Never Smoker
Asthma Status	N Percent (95% CI)	N Percent (95% CI)	N Percent (95% CI)
Current Asthma	71 21.0 (15.9, 26.0)	110 28.8 (23.6, 34.0)	155 50.2 (44.1, 56.4)
No Asthma	885 24.4 (22.8, 26.0)	1133 28.9 (27.3, 30.5)	1683 46.7 (44.9, 48.5)



Comment: There were no statistically significant differences in smoking status between adults with current asthma and adults without asthma ($\chi^2=1.76$; $p=0.4143$). A current smoker is defined as a survey respondent that has smoked at least 100 cigarettes in their lifetime and currently smokes every day or some days. A former smoker is a respondent that has smoked at least 100 cigarettes in their lifetime, but does not currently smoke. A never smoker is a respondent that has not smoked at least 100 cigarettes in their lifetime.

**Table 10. Comparison of weight status in adults, by asthma status—
New Hampshire, 2001**

Asthma Status	Overweight/Obese	Not Overweight/Obese
	N Percent (95% CI)	N Percent (95% CI)
Current Asthma	194 62.7 (56.5, 68.8)	120 37.3 (31.2, 43.5)
No Asthma	1943 55.4 (53.6, 57.3)	1557 44.6 (42.7, 46.4)



Comment: Adults with current asthma were more likely to be overweight or obese than adults with no asthma ($\chi^2= 4.73$; $p=0.0298$). 62.7% of respondents with current asthma were either overweight or obese, versus 55.4% of adults with no asthma. Overweight was defined as a body mass index ≥ 25 but less than 30. Obese was defined as a body mass index ≥ 30 . Body mass index was derived from self-reported data on weight and height; BMI is equal to weight (measured in kilograms) divided by height squared (measured in meters).

INPATIENT HOSPITALIZATION FOR ASTHMA

Data on inpatient hospital stays for asthma can be used to examine the severity of asthma, both from the perspective of the individual and from the perspective of society. Approximately 475,000 hospitalizations for asthma occur each year in the United States.⁸ In 1994--the most recent year for which national cost estimates are available--the total cost of asthma inpatient hospital care was approximately 1.8 billion dollars.⁹ Most, if not all, hospitalizations for asthma can be prevented if the disease is managed according to established guidelines. As a result, public health action to reduce the number of hospitalizations for asthma can result in significant reductions in asthma morbidity and overall cost to society.

Due to the fact that asthma inpatient hospitalization rates measure a severe and relatively infrequent outcome of the disease, they are not useful indicators of asthma prevalence in the population. Hospitalization data are still a good source of information for asthma surveillance, however, because the information may help identify specific population groups at greater risk of significant morbidity and mortality due to asthma. Such groups can then be targeted for aggressive intervention to prevent hospitalization.

This section presents data on inpatient hospitalizations for asthma in New Hampshire from 1996 to 2000. It address questions such as: what is the annual number and rate of asthma hospitalizations, how have asthma hospitalization rates changed over time, and do asthma hospitalizations vary by gender, age group, or season of the year? New Hampshire data are compared to both state and national objectives for asthma hospitalization rates to assess our progress toward meeting these goals. In order to provide a more complete picture of the burden of asthma in the state, data on length of stay and charges associated with asthma hospitalizations are also included.

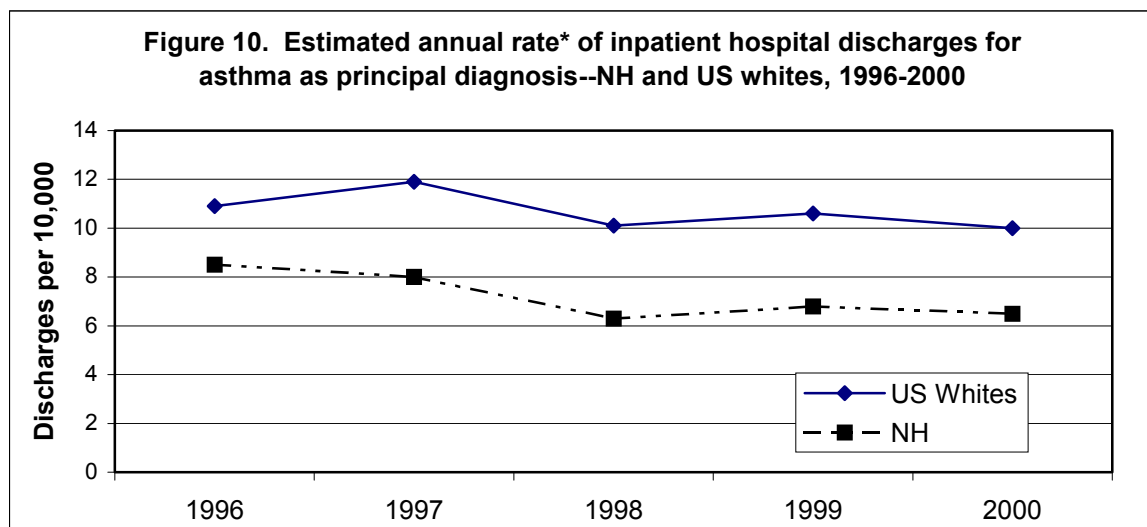
There is no confirmed asthma case classification for hospital discharge data. A probable case is defined as a hospital record listing asthma as the primary discharge diagnosis.¹⁰ Since an individual may have multiple hospitalizations for asthma during any given time period, discharge data represent the number of *hospitalizations* rather than the number of *persons* hospitalized. For this report, an asthma hospitalization was defined as an inpatient hospital data set record of a New Hampshire resident listing asthma (ICD-9 CM code 493.0-493.9) as the principal discharge diagnosis. New Hampshire residents hospitalized in another state are not included in this data set; therefore, the true asthma-related hospitalization rate is probably higher.

Table 11. Annual number and rate* of inpatient hospital discharges for asthma as principal diagnosis--New Hampshire, 1996-2000

	1996	1997	1998	1999	2000
Number	956	924	732	800	796
Crude Rate	8.2	7.9	6.2	6.7	6.4
Age-Adjusted** Rate	8.5	8.0	6.3	6.8	6.5
95% Confidence Interval	7.9, 9.0	7.5, 8.5	5.9, 6.8	6.3, 7.2	6.0, 6.9

*Rates are per 10,000 population.

**Age-adjusted to the 2000 US standard population.



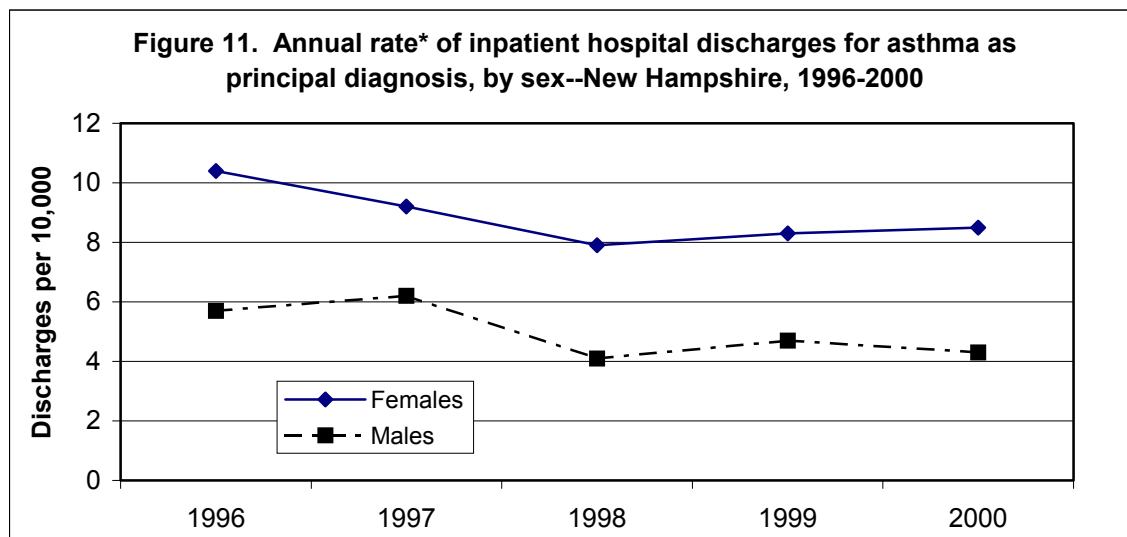
*Age-adjusted to the 2000 US standard population.

Comment: The age-adjusted rate of inpatient hospitalizations for asthma among New Hampshire residents was 6.5 per 10,000 in 2000. The asthma hospitalization rate was relatively stable from 1998-2000. A significant decline occurred between 1997 and 1998, when the rate decreased from 8.0 per 10,000 (95% CI: 7.5-8.5) to 6.3 per 10,000 (95% CI: 5.9-6.8). This decline was also seen in national data; the rate of asthma hospitalizations among US whites fell from 11.9 per 10,000 in 1997 to 10.1 per 10,000 in 1998. The reason for the decline is not entirely clear, but may be due to changes in coding or billing practices, payment mechanisms, or practice patterns that affect decisions by health care providers to hospitalize patients. Overall, New Hampshire asthma hospitalization rates were lower than US white rates from 1996-2000.

Table 12. Annual number and rate* of inpatient hospital discharges for asthma as principal diagnosis, by sex—New Hampshire, 1996-2000

	1996		1997		1998		1999		2000	
Sex	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
Male	323	5.7	357	6.2	238	4.1	274	4.7	261	4.3
Female	633	10.4	567	9.2	494	7.9	526	8.3	535	8.5
Total	956	8.5	924	8.0	732	6.3	800	6.8	796	6.5

*Rates are per 10,000 population and age-adjusted to the 2000 US standard population.



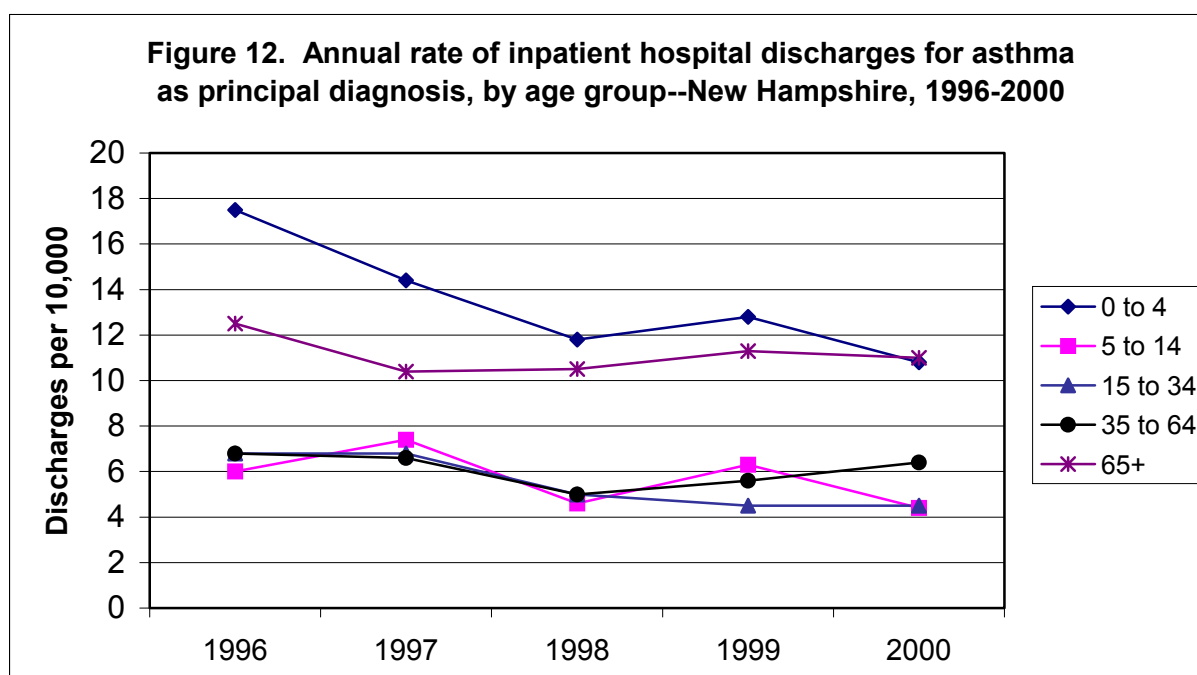
*Age-adjusted to the 2000 US standard population.

Comment: Females have a higher rate of inpatient hospitalization for asthma than males in New Hampshire. In 2000, the rate for females was 8.5 per 10,000 versus 4.3 per 10,000 for males. This pattern of gender difference in asthma hospitalizations was consistent over time; female rates exceeded male rates each year from 1996 to 2000. Nationally, females are also more likely to be hospitalized for asthma than males. In 2000, the asthma-related hospitalization rate for US females was about 25% higher than the rate for US males.¹¹

Table 13. Annual number and rate* of inpatient hospital discharges for asthma as principal diagnosis, by age group—New Hampshire, 1996-2000

	1996		1997		1998		1999		2000	
Age Group	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
0-4	139	18.6	113	15.4	91	12.5	98	13.3	82	10.8
5-14	102	6.0	128	7.4	81	4.7	112	6.3	80	4.4
15-24	117	8.2	106	7.4	73	5.0	63	4.2	49	3.2
25-34	112	6.0	119	6.4	90	4.9	82	4.6	92	5.8
35-44	114	5.3	132	6.0	98	4.4	135	6.1	124	5.6
45-54	118	8.1	123	8.1	81	5.2	84	5.2	129	7.0
55-64	80	9.6	57	6.7	67	7.5	61	6.6	78	7.1
65-74	94	12.3	66	8.7	70	9.2	69	9.0	64	8.2
75-84	52	11.0	54	11.2	55	11.3	73	14.5	74	14.4
≥85	28	17.1	26	15.4	26	14.9	23	12.9	24	13.2
Total	956	8.5	924	8.0	732	6.3	800	6.8	796	6.5

*Rates are per 10,000 population.

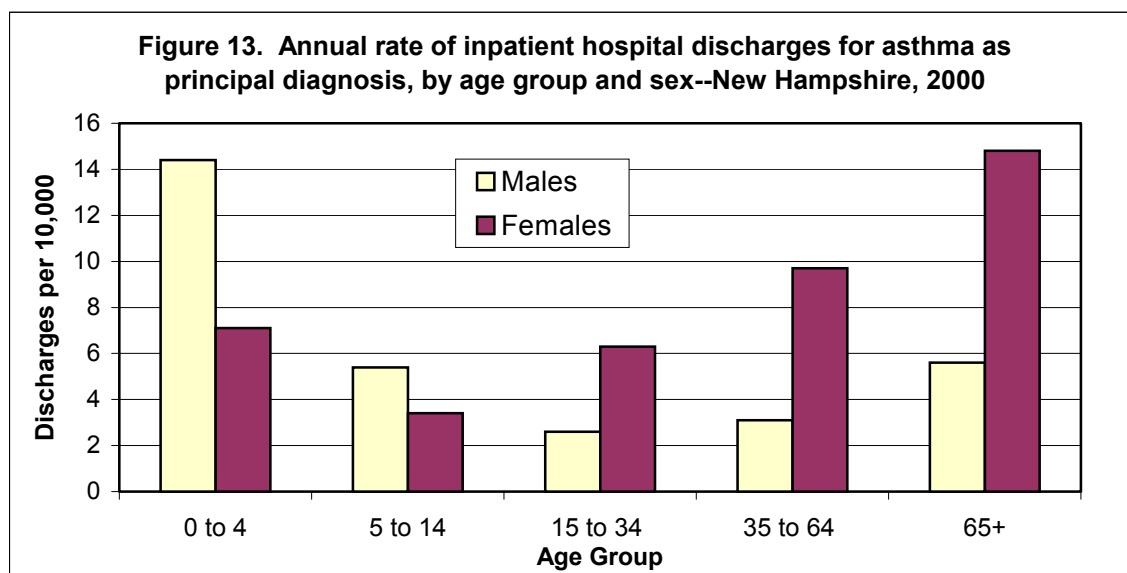


Comment: Rates of inpatient hospitalization for asthma in New Hampshire are highest among children 0 to 4 years of age and adults 75 years of age or older. Nationally, children aged 0 to 4 have the highest rates. The hospitalization rate for New Hampshire children 0 to 4 has declined in recent years, from a high of 18.6 per 10,000 in 1996 to 10.8 per 10,000 in 2000. Adults age 65 and older had the second-highest rates of hospitalization for asthma, although this may be partly explained by the fact that older individuals are more likely to have other conditions such as chronic obstructive pulmonary disease (COPD) that may be incorrectly classified as asthma on the hospital discharge record.

Table 14. Number and rate* of inpatient hospital discharges for asthma as principal diagnosis, by age group and sex—New Hampshire, 2000

	0 to 4		5 to 14		15 to 34		35 to 64		65+	
Sex	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
Male	56	14.4	50	5.4	41	2.6	79	3.1	35	5.6
Female	26	7.1	30	3.4	100	6.3	252	9.7	127	14.0

*Rates are per 10,000 population.



Comment: The likelihood of hospitalization for asthma varies considerably by both age and gender. Males aged 0 to 14 have higher rates of asthma hospitalization than females. Females have higher rates after age 14, and the difference between male-female rates increases with age. The change in sex ratio has been shown in numerous studies and is more readily apparent with severe outcomes of asthma (e.g., hospitalization and death).¹² The reasons for the switch from higher rates in males to higher rates in females at adolescence are not entirely clear, but may be partly due to hormonal changes that occur during puberty.

Table 15. Comparison of New Hampshire inpatient hospitalization rates* and 2010 objectives, by age group

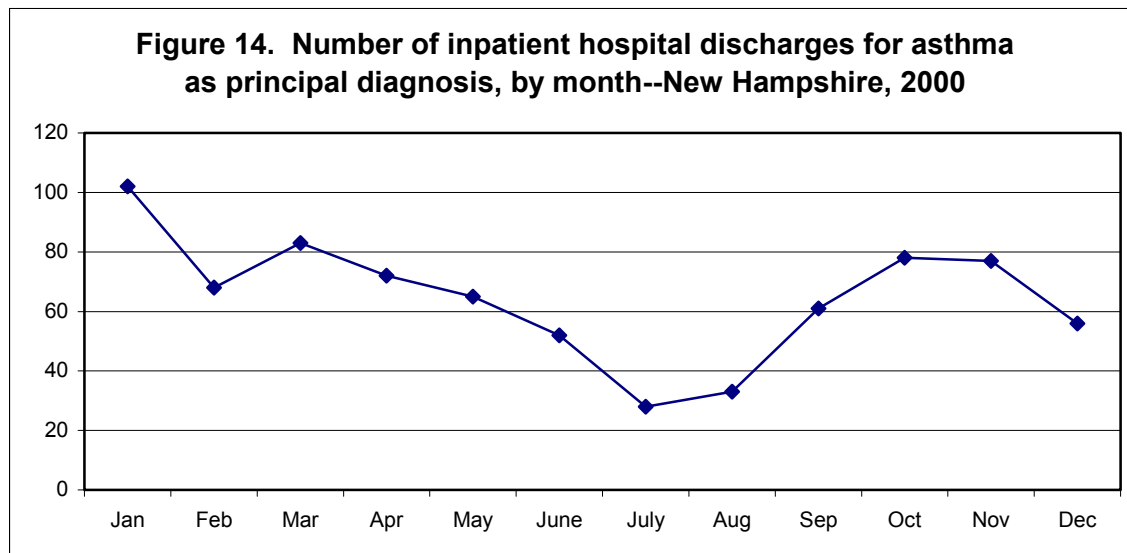
	2000 NH Rate	2010 Objective
Age Group		US Healthy People
0 to 4	10.9	25
5 to 64	5.5	7.7
≥65	10.9	11
		Healthy NH
0 to 17	5.7	7.9

*Rates are per 10,000 population.

Comment: Both the US Healthy People 2010 and Healthy New Hampshire 2010 initiatives include objectives that address hospitalization for asthma. Healthy People 2010 Objective 24-2 is to reduce asthma hospitalizations to 25 per 10,000 among children 0 to 4 years of age, 7.7 per 10,000 among persons aged 5 to 64, and 11 per 10,000 among persons 65 and older.¹³ These target rates use hospitalizations with a primary discharge diagnosis of asthma for the numerator and resident population from the US Census for the denominator. In 2000, the asthma hospitalization rates for children aged 0 to 4 and persons 5 to 64 in New Hampshire were lower than the Healthy People objectives for these age groups. The rate for New Hampshire adults 65 and older was essentially equal to the Healthy People target.

Healthy New Hampshire 2010 includes an objective to reduce hospitalizations for pediatric asthma to 7.9 per 10,000. Pediatric asthma hospitalizations are defined as those that occur among persons 0 to 17 years of age.¹⁴ The pediatric asthma hospitalization rate in 2000 was 5.7 per 10,000, slightly lower than the target rate. Efforts to ensure that asthma hospitalization rates among New Hampshire residents of all ages remain at or below target rates, and to decrease these rates even further, are needed in the coming years. A complete list of asthma-related Healthy People 2010 and Healthy New Hampshire 2010 objectives can be found in Appendix C.

SEASONAL VARIATION IN ASTHMA HOSPITALIZATIONS



Comment: The number of hospitalizations for asthma in New Hampshire shows a distinct seasonal variation, with peaks in January-March and in the late fall (October and November). The smallest number of asthma hospitalizations occurs in the summer months. This seasonal pattern was consistent over the period 1996-2000, and has also been documented in other states.^{15 16} In 2000, the greatest number of asthma hospitalizations among New Hampshire residents occurred during the month of January (102). In contrast, there were only 28 asthma hospitalizations in July and 33 in August of that year. Hospitalization may be higher during the fall and winter months for several reasons, including the presence of seasonal allergens such as pollen; increased amounts of time spent indoors and exposed to potential triggers such as dust mites, mold, animal dander, and environmental tobacco smoke; and greater frequency of upper respiratory infections.¹⁷

**Table 16. Charges and length of stay (LOS) for asthma inpatient hospitalizations—
New Hampshire, 1996-2000**

	1996 (N=956)	1997 (N=924)	1998 (N=732)	1999 (N=800)	2000 (N=796)
Charges (dollars*)					
Mean	4535	4508	4757	4971	5203
Median	3447	3510	3634	3850	4095
	4,335,149	4,165,209	3,481,980	3,976,751	4,141,661
Mean	3.5	3.1	3.2	3.1	3.1
Median	3.0	2.0	3.0	2.0	2.0
Total	3318	2878	2350	2476	2436

*Unadjusted dollars

Comment: In 2000, there were 796 inpatient hospitalizations for asthma, resulting in 2,436 hospital days and total charges of approximately 4.1 million dollars. The mean length of stay for an asthma hospitalization was 3.1 days and the median charge was \$4,095. While the mean length of stay remained relatively stable during the period 1996-2000, the median charge per hospitalization steadily increased. Healthcare costs in general also rose over this period.

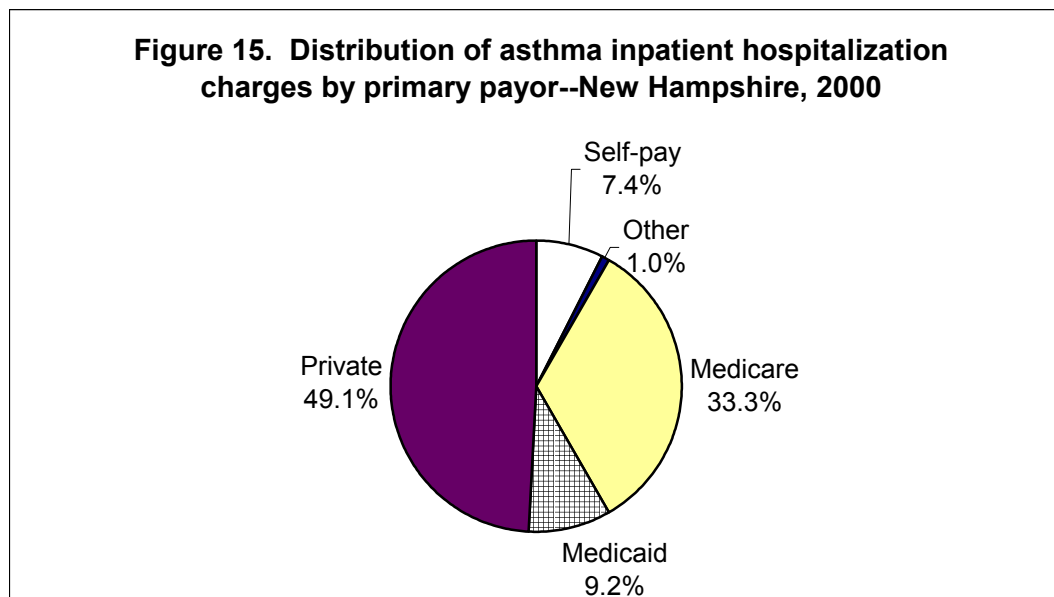
Charges for inpatient hospital services represent just one component of direct medical expenditures for asthma. Direct medical expenditures also include charges for outpatient/emergency department hospital services, physician services, and medications. The cost of inpatient hospital care for asthma is significantly higher than for outpatient care; as a result, hospitalizations typically constitute a sizable portion of total direct costs. Nationally, the portion of direct medical expenditures accounted for by inpatient charges has decreased over the past 20 years; this is largely due to shorter lengths of stay rather than a decrease in number of hospital admissions.¹⁸

In 1998, the estimated total cost of asthma in New Hampshire was 46 million dollars. Total cost was composed of 26 million dollars in direct medical expenditures and 20 million dollars in indirect costs.¹⁹ Indirect costs of asthma include non-medical economic losses such as days missed from school or work, caregiver costs, travel costs, early retirement due to disability, and years of productive life lost due to premature death.²⁰

Table 17. Asthma inpatient hospitalization charges, by primary payor—New Hampshire, 2000

	Number of hospitalizations	Total charges (dollars*)	Percent of total charges
Payor			
Self-pay	68	304,538	7.4
Private insurance	430	2,032,335	49.1
Medicaid	87	382,590	9.2
Medicare	204	1,378,842	33.3
Other	7	43,356	1.0
Total	796	4,141,661	100

*Unadjusted dollars



Comment: A primary payor is the principal source from which a hospital expects to receive payment for charges incurred from a hospitalization. The information on primary payor in the New Hampshire inpatient hospital data set is divided into eleven categories. For the purposes of this analysis, these were grouped into the following five categories: Private (HMO, Blue Cross, or Commercial insurance), Medicaid (Medicaid or Medicaid Managed Care), Medicare (Medicare or Medicare Managed Care), Self-pay, and Other (Worker's Compensation, Other government, or Other).

In 2000, private insurance was the expected primary payor for half of all inpatient hospital charges in New Hampshire. Medicare was the primary payor for 33% of hospital charges that year, with total charges of approximately 1.4 million dollars. Although Medicare patients accounted for 33% of charges, they represented only 26% of asthma hospitalizations. This indicates that hospitalizations of Medicare patients for asthma tend to be more costly than hospitalizations of other individuals. Medicaid accounted for 9% of all charges and self-pay accounted for 7%. The distribution of charges by payor was consistent over the period 1996-2000.

EMERGENCY DEPARTMENT VISITS FOR ASTHMA

There were approximately 1.8 million emergency department visits for asthma in the United States in 2000, a rate of 67 per 10,000 people.²¹ In 1994--the most recent year for which national cost estimates are available--the total cost of emergency department services for asthma was approximately at 479 million dollars.²² Similar to inpatient hospitalization data, emergency department visit data can be used to examine the severity of asthma, both in terms of morbidity among individuals with asthma and overall cost to society. Management of asthma according to established guidelines can prevent most emergency department visits for the disease.

This section presents data on emergency department visits for asthma in New Hampshire from 1996 to 2000. It address questions such as: what is the annual number and rate of asthma emergency department visits, how have emergency department visit rates changed over time, and do emergency department visits vary by gender, age group, or season of the year? New Hampshire data are compared to national objectives for asthma emergency department visit rates to assess our progress toward meeting these goals. Data on length of stay and charges associated with asthma emergency department visits are also included in order to provide a more complete picture of asthma's impact in the state.

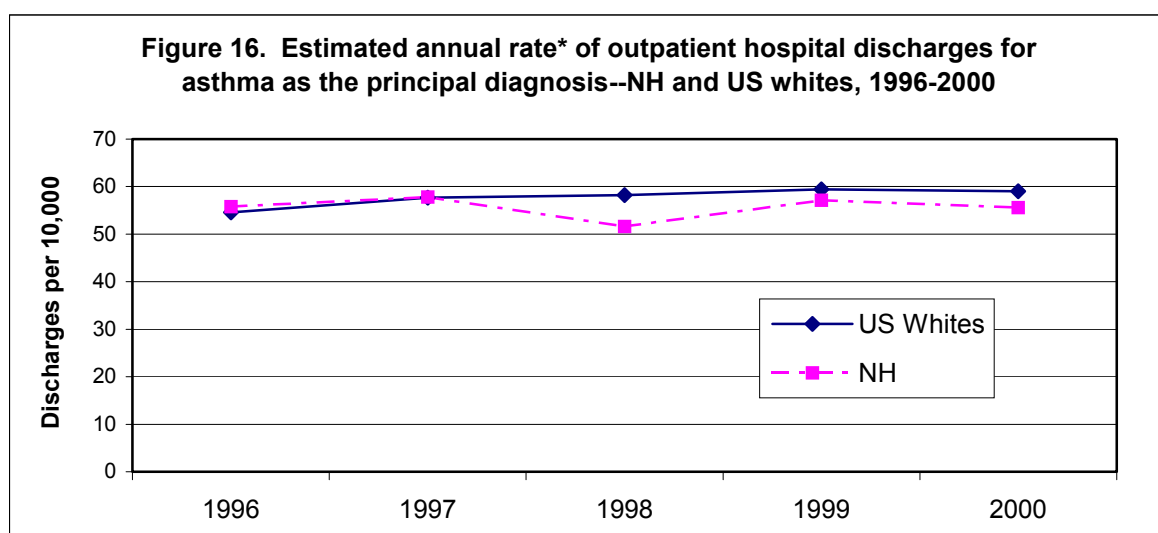
There is no confirmed asthma case classification for emergency department data. A probable case is defined as an emergency department record listing asthma as the primary discharge diagnosis.²³ Since an individual may have multiple emergency department visits for asthma during any given time period, discharge data represent the number of *visits* rather than the number of *persons* who sought care for asthma in the emergency department. For this report, an asthma emergency department visit was defined as an outpatient hospital data set record of a New Hampshire resident listing asthma (ICD-9 CM code 493.0-493.9) as the principal discharge diagnosis. This case definition may slightly overestimate the number of emergency department visits for asthma since the outpatient data set includes information on emergency department visits as well as scheduled ambulatory surgeries; however, it seems unlikely that many scheduled ambulatory surgeries would have a primary diagnosis of asthma. A field designating patient type--emergency department, ambulatory surgery, observation, or other--was added to the outpatient hospital discharge data set beginning in 1999. In 2000, 93% of all discharge records with asthma as the primary diagnosis were classified as emergency department visits, 4% were observation stays, 0.15% were ambulatory surgeries, and 2.8% were designated as 'other'. As a result, the case definition used for this report should measure emergency department service utilization by New Hampshire residents reasonably well. New Hampshire residents that received care at an emergency department in another state are not included in the outpatient hospital data set.

Table 18. Annual number and rate* of outpatient hospital discharges for asthma as principal diagnosis—New Hampshire, 1996-2000

	1996	1997	1998	1999	2000
Number	6485	6795	6136	6853	6793
Crude Rate	55.9	57.9	51.8	57.1	55.0
Age-Adjusted** Rate	55.8	57.8	51.6	57.1	55.6
95% Confidence Interval	54.4-57.2	56.4-59.2	50.3-52.9	55.8-58.5	54.3-56.9

*Rates are per 10,000 population.

**Age-adjusted to the 2000 US standard population.



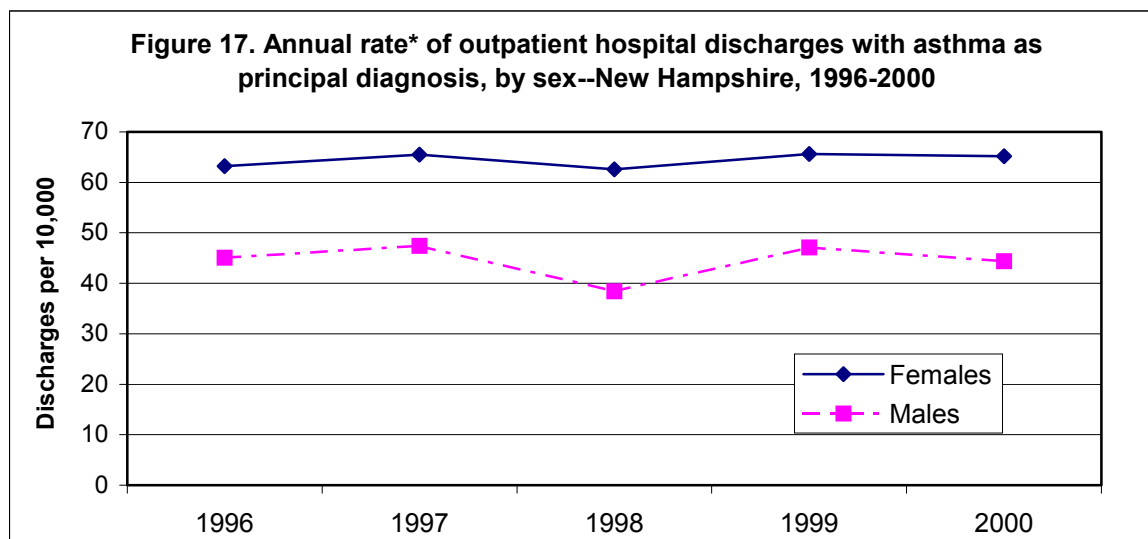
*Age-adjusted to the 2000 US standard population.

Comment: The age-adjusted rate of outpatient hospital (emergency department) discharges for asthma among New Hampshire residents was 55.6 per 10,000 in 2000. This rate was relatively stable from 1996-2000, except for a temporary dip to 51.6 per 10,000 in 1998. The reason for this decline is unclear, and the rate returned to previous levels the following year. The rate of emergency department visits for asthma among US whites increased over the period 1996-2000, from 54.6 per 10,000 in 1996 to 59 per 10,000 in 2000.²⁴ New Hampshire rates were slightly lower than US white rates from 1998-2000.

Table 19. Annual number and rate* of outpatient hospital discharges for asthma as principal diagnosis, by sex—New Hampshire, 1996-2000

	1996		1997		1998		1999		2000	
Sex	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
Male	2671	45.1	2819	47.4	2301	38.4	2833	47.1	2699	44.4
Female	3814	63.2	3976	65.5	3835	62.6	4020	65.6	4094	65.2
Total	6485	55.8	6795	57.8	6136	51.6	6853	57.1	6793	55.6

*Rates are per 10,000 population and age-adjusted to the 2000 US standard population.



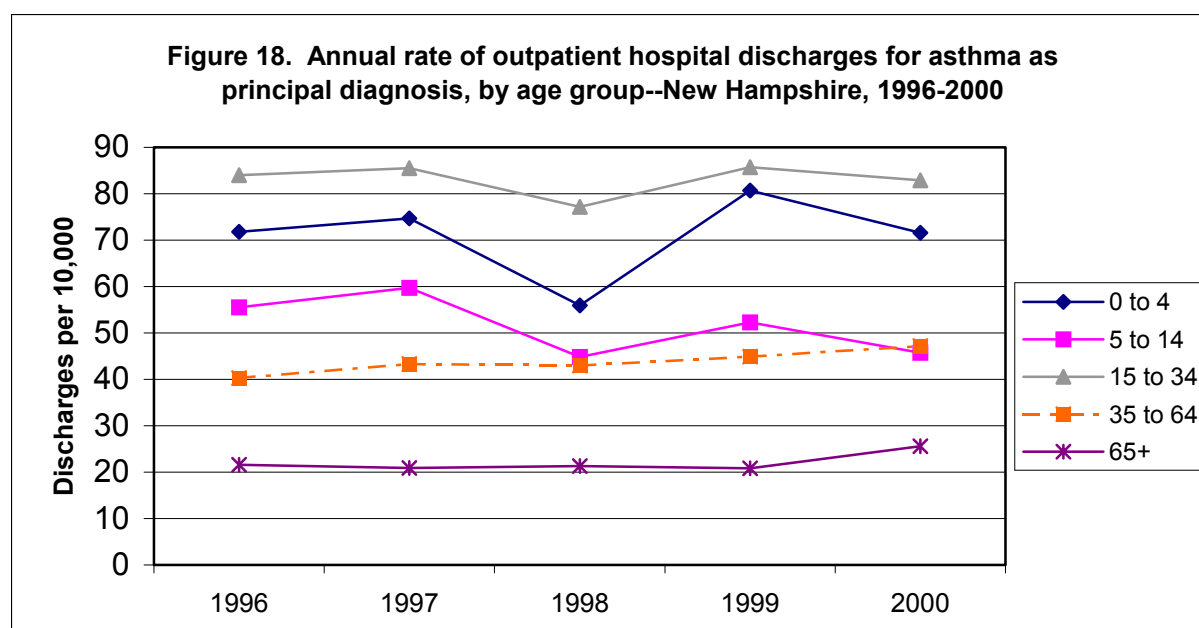
*Age-adjusted to the 2000 US standard population.

Comment: Females have a higher rate of emergency department visits for asthma than males, both in New Hampshire and nationally. This gender difference is also seen in data on inpatient hospitalizations and mortality due to asthma. In 2000, the rate of asthma emergency department visits for New Hampshire females was 65.2 per 10,000, versus 44.4 per 10,000 for New Hampshire males. Rates for both genders were quite stable from 1996 to 2000, except for a temporary decline in the male rate in 1998. The difference between the male and female rates was consistent over time, with female rates about 30% higher than male rates each year.

Table 20. Annual number and rate* of outpatient hospital discharges for asthma as principal diagnosis, by age group—New Hampshire, 1996-2000

	1996		1997		1998		1999		2000	
Age Group	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
0-4	529	70.9	581	79.2	433	59.2	618	83.6	542	71.6
5-14	950	55.5	1031	59.8	788	45.3	935	52.7	830	45.7
15-24	1459	102.3	1457	101.1	1288	87.4	1397	92.5	1300	83.6
25-34	1316	70.0	1374	74.0	1223	67.2	1348	75.7	1316	82.2
35-44	1052	49.0	1162	53.0	1176	53.0	1226	55.0	1295	58.6
45-54	572	39.3	589	38.9	644	41.4	670	41.7	807	43.9
55-64	300	36.0	304	35.7	279	31.3	356	38.5	325	29.6
65-74	175	22.9	198	26.0	177	23.3	161	21.0	208	26.6
75-84	96	20.3	74	15.3	94	19.3	118	23.5	130	25.3
≥85	36	22.0	25	14.8	34	19.4	24	13.4	40	21.9
Total	6485	55.8	6795	57.8	6136	51.6	6853	57.1	6793	55.6

*Rates are per 10,000 population.

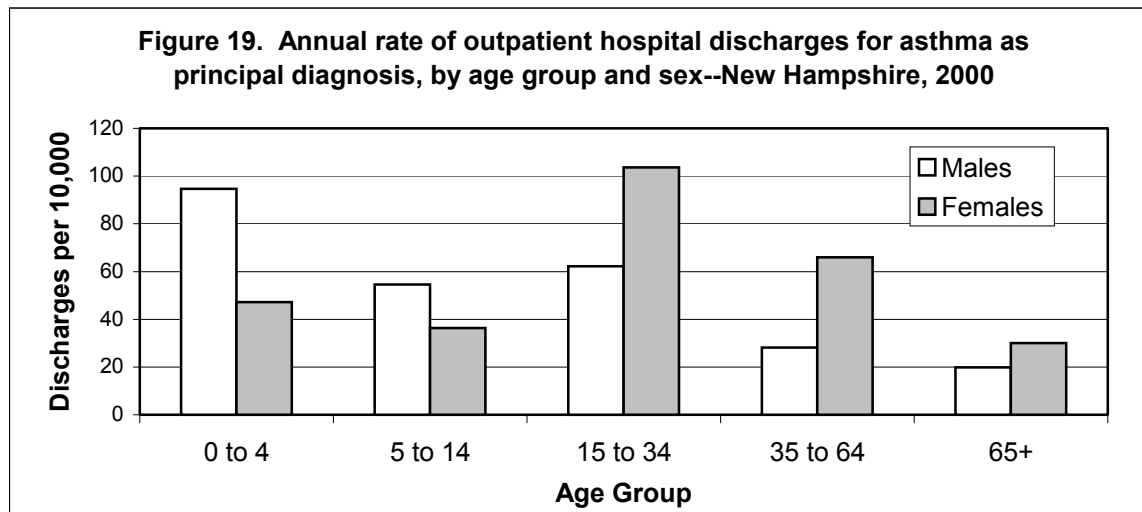


Comment: The highest rates of emergency department visits for asthma are seen in New Hampshire residents 15 to 34 years of age (Figure 18). In contrast, this age group has one of the lowest rates of inpatient hospitalization for asthma. Young children aged 0 to 4, the age group with the highest rates of inpatient hospitalization for asthma, had the second-highest rates of emergency department visits. Nationally, children 0 to 4 have the highest rates of asthma emergency department visits, and rates decrease steadily with increasing age.²⁵

Table 21. Number and rate* of outpatient hospital discharges for asthma as principal diagnosis, by age group and sex—New Hampshire, 2000

	0 to 4		5 to 14		15 to 34		35 to 64		65+	
Sex	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
Male	369	94.6	507	54.6	981	62.2	719	28.1	123	19.8
Female	173	47.2	323	36.3	1635	103.7	1708	66.0	255	29.7

*Rates are per 10,000 population.



Comment: The rate of emergency department visits for asthma varies considerably by both age and gender. From age 0 to 14, New Hampshire males have higher rates of asthma emergency department visits than New Hampshire females. After age 14, females have higher rates. This age-gender difference is also seen in data on inpatient hospitalizations for asthma. In 2000, the emergency department visit rate for females peaked at age 15 to 34 and then declined steadily with age. Among males, children 0 to 4 years of age had the highest rate of emergency department visits for asthma.

Table 22. Comparison of New Hampshire outpatient hospitalization rates* and 2010 objective, by age group

	2000 NH Rate	2010 Objective 24-3
Age Group		
<5	71.6	80
5 to 64	58.0	50
≥65	25.5	15

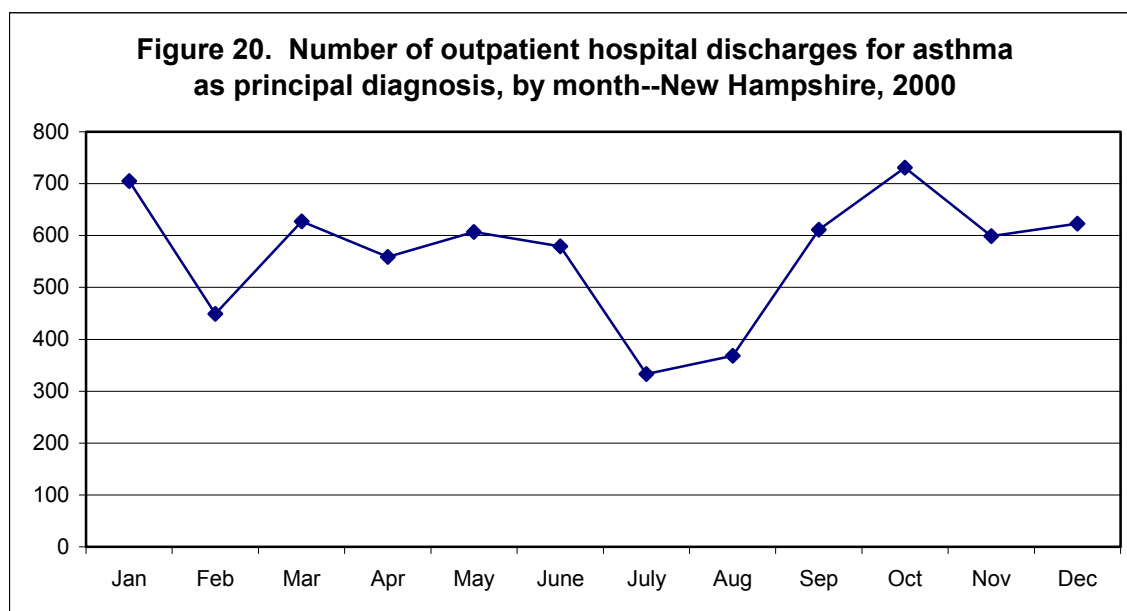
*Rates are per 10,000 population.

Comment: Emergency department visits for asthma are the basis of a national objective for asthma in Healthy People 2010. This objective uses emergency department visits with a primary discharge diagnosis of asthma (ICD-9-CM code 493.0-493.9) for the numerator and resident population from the US Census for the denominator. Objective 24-3 calls for a reduction of emergency department visits for asthma to 80 per 10,000 in children under age 5, 50 per 10,000 in persons aged 5 to 64 years, and 15 per 10,000 in persons aged 65 and older.

The rate of emergency department visits for New Hampshire children under age 5 was lower than the Healthy People 2010 target rate for this age group in 2000. New Hampshire rates for persons 5 to 64 and 65 and older were higher than the corresponding 2010 targets, indicating areas where progress needs to be made in the coming years.

A complete list of asthma-related Healthy People 2010 objectives can be found in Appendix C.

SEASONAL VARIATION IN EMERGENCY DEPARTMENT VISITS FOR ASTHMA



Comment: The number of emergency department visits for asthma in New Hampshire varies by month of the year, with distinct peaks during the fall and winter seasons and a decline in the summer. In 2000, there were 705 emergency department visits for asthma in January and 731 visits in October, approximately double the number that occurred during the summer months of July (333) and August (368). A similar seasonal pattern is seen in data on inpatient hospitalizations for asthma. Rates of inpatient and emergency department visits may be higher during the fall and winter months due to seasonal allergies; increased exposure to indoor air triggers such as dust, mold, pet dander, and environmental tobacco smoke; and greater likelihood of developing an upper respiratory infection that may exacerbate asthma.²⁶

Table 23. Charges for asthma outpatient hospitalizations—New Hampshire, 1996-2000

	1996 (N=6485)	1997 (N=6795)	1998 (N=6136)	1999 (N=6853)	2000 (N=6793)
Charges (dollars*)					
Mean	416	410	452	464	487
Median	306	301	325	342	358
Total	2,695,971	2,783,508	2,770,292	3,176,176	3,306,318

*Unadjusted dollars

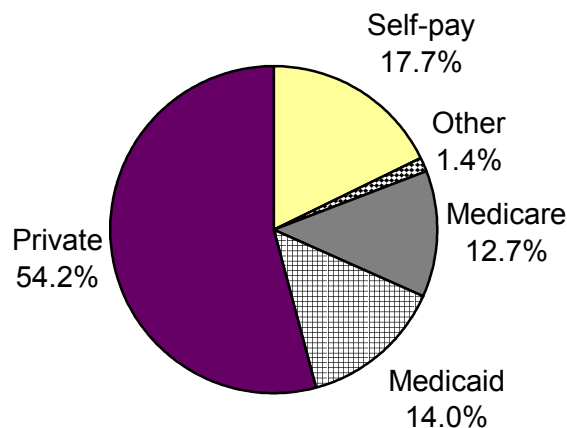
Comment: There were 6,793 emergency department visits for asthma in New Hampshire in 2000, resulting in over 3.3 million dollars in charges. The median charge for an asthma emergency department visit has increased gradually in recent years, from \$301 in 1997 to \$358 in 2000. Healthcare costs in general also rose over this period.

Table 24. Asthma outpatient hospitalization charges, by primary payor—New Hampshire, 2000

	Number	Total charges (dollars*)	Percent of total charges
Payor			
Self-pay	1338	583,794	17.7
Private insurance	3642	1,793,685	54.2
Medicaid	1058	463,598	14.0
Medicare	658	419,448	12.7
Other	97	45,793	1.4
Total	6793	3,306,318	100

*Unadjusted dollars

Figure 21. Distribution of asthma outpatient hospitalization charges by primary payor--New Hampshire, 2000



Comment: Private insurance (e.g., HMO or Blue Cross) was the primary source of payment for 54% of all emergency department charges in 2000. Medicaid and Medicare each accounted for about 14% of emergency department visit charges. 18% of emergency department charges were classified as self-pay, compared to 7% of inpatient hospitalization charges. The self-pay category may represent the underinsured or uninsured population in New Hampshire because these individuals, who generally lack regular access to primary care or pharmacological services, must often use emergency departments as their main or sole source of medical care for asthma in times of need.

MORTALITY FROM ASTHMA

There were 4,487 deaths from asthma in the United States in 2000, including eighteen among New Hampshire residents.²⁷ Asthma deaths are uncommon events, especially among young people. As with hospitalizations and emergency department visits, asthma deaths are more likely to occur in females. Nationally, this gender difference in mortality has grown over the past two decades; asthma mortality rates between 1980 and 1999 decreased by 11% among males, but increased 42% among women.²⁸

This section presents information on deaths from asthma in New Hampshire from 1990 to 2000. It includes data on the number and rate of asthma deaths during this time period. Annual death counts for males and females are also included. It was not possible to determine whether asthma mortality rates varied by gender, age, or geographic location due to the small number of deaths in each population subgroup during this time period.

For this report, an asthma death was defined as a New Hampshire resident death record listing asthma as the underlying cause of death. Death data were coded under the Ninth Revision of the International Classification of Diseases (ICD-9) from 1990-1998; a diagnosis code of 493.0-493.9 was used to identify asthma deaths during these years. ICD Revision 10 was implemented in 1999; therefore, the ICD-10 asthma diagnosis codes J-45 and J-46 were used to identify asthma deaths that occurred in 1999 and 2000.

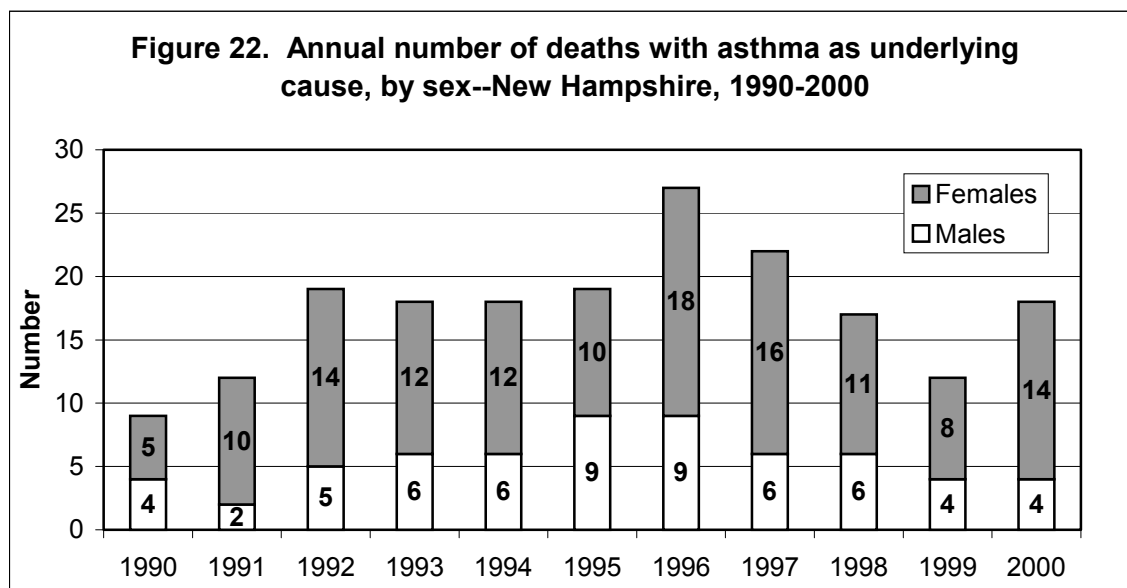
The mortality data from 1999 and 2000 cannot be directly compared with the data from previous years due to the change in coding system from ICD-9 to ICD-10. In order to account for the effect of implementing ICD-10 on mortality statistics, comparability ratios for selected causes of death were calculated by the National Center for Health Statistics, National Vital Statistics System. The comparability ratio for asthma is 0.8938. This means that changes in the selection and grouping of underlying causes of death under ICD-10 reduced the possibility of asthma being coded as the underlying cause of death by about 11%.

Comparability ratios may be applied to the number and rate of deaths that occurred prior to 1999 in order to adjust for the introduction of ICD-10. In this report, the comparability ratio has been applied to New Hampshire asthma mortality rate data from 1990-1998. Asthma death count data were not adjusted using the comparability ratio in order to present the actual number of deaths per year.

Table 25. Annual number of deaths with asthma as underlying cause of death, by sex—New Hampshire, 1990-2000*

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Males	4	2	5	6	6	9	9	6	6	4	4
Females	5	10	14	12	12	10	18	16	11	8	14
Total	9	12	19	18	18	19	27	22	17	12	18

*Cause of death coding converted from ICD-9 to ICD-10 in 1999. Comparability ratio= 0.8938 for asthma; fewer deaths classified as asthma under ICD-10. Comparability ratio not applied to death count data for 1990-1998.



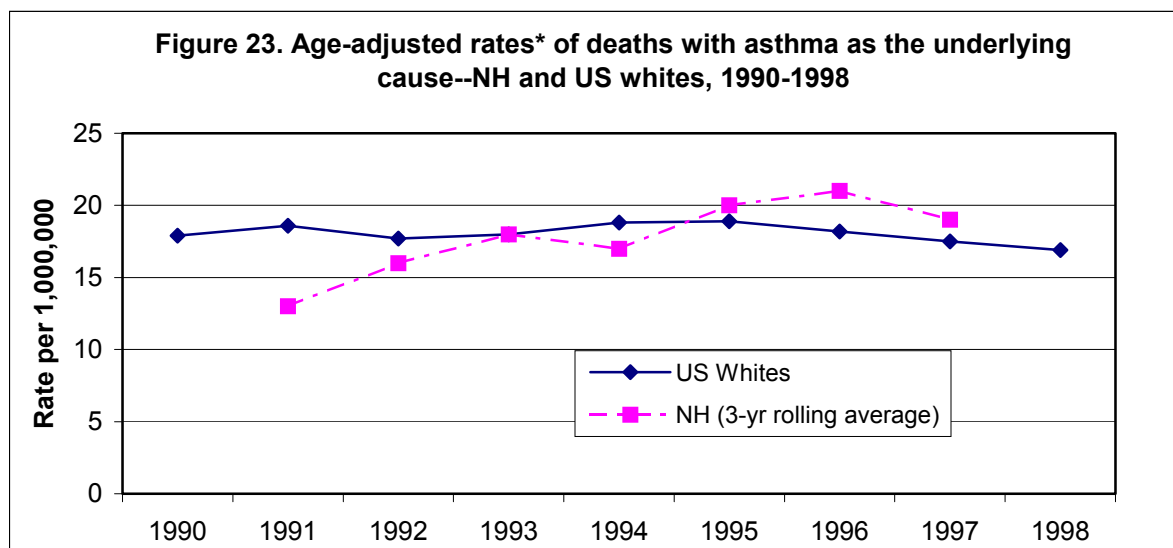
Comment: There were a total of 191 deaths of New Hampshire residents from asthma over the period 1990-2000. Sixty-eight percent (130) of all deaths were among female residents. Nationally, the number of asthma deaths in females is about one and a half times the number in males.²⁹ The greatest number of asthma deaths in New Hampshire occurred in 1996, when 27 resident deaths listed asthma as the underlying cause. In 2000, there were 18 deaths from asthma. The comparability ratio for asthma was not applied to New Hampshire data on annual death counts in order to present the actual number of deaths that occurred each year. As a result, trends in asthma death counts over time should be interpreted with caution.

Table 26. Age-adjusted rates* of death with asthma as underlying cause--NH resident population, 1990-2000

	1990-92	1991-93	1992-94	1993-95	1994-96	1995-97	1996-98	1999-2000**
Number	40	49	55	55	64	68	66	30
Rate	12	14	16	15	18	19	17	13

*Rate per 1,000,000. Comparability ratio applied to account for coding conversion from ICD-9 to ICD-10 in 1999.

**Rate based on 2 years of data only.



*Age-adjusted to the 2000 US standard population. NH rates displayed at midpoint year.

Comment: Due to the relatively small number of asthma deaths per year, reliable annual mortality rates for 1990-2000 could not be calculated. As a result, years of data were combined and New Hampshire rates were calculated as three-year rolling averages. These rates were calculated using the number of deaths and the total population for each year included in the three-year span (except for the 1999-2000 rate, which is based on two years of data only). New Hampshire rolling average rates for 1990-1998 are displayed at the midpoint year, along with the annual rate for US whites, in Figure 23. A three-year rate for 1997-1999 was not calculated due to the coding change from ICD-9 to ICD-10 that occurred in 1999.

The asthma mortality rate among US whites was quite stable from 1990-1998, averaging about 17 deaths per million population each year.

Table 27. Comparison of New Hampshire asthma mortality rates 1990-2000 and Healthy People 2010 objective, by age group

Age Group	Number of deaths	NH Death Rate* 1990-2000	2010 Objective
0 to 4	0	-	1.0
5 to 14	2	-	1.0
15 to 34	9	-	3.0
35 to 64	63	12.8	9.0
≥65	117	77.9	60.0

*Rates are per 1,000,000. Rates are not displayed if fewer than 20 events were reported (noted as -).

Comment: Healthy People 2010 includes an objective to reduce mortality from asthma to one death per million among children 0 to 4 and 5 to 14 years of age, three per million among persons 15-34 years of age, nine per million among persons 35-64, and 60 per million among persons 65 and older. Age-specific asthma mortality rates for New Hampshire residents could only be calculated for the two oldest age groups due to the small number of deaths among persons less than 35 years of age. Approximately 61% of all asthma deaths from 1990-2000 occurred among persons aged 65 and older. Mortality rates were calculated using the total number of asthma deaths in each age group for the period 1990-2000 for the numerator and the midpoint year (1995) age-specific population multiplied by the number of years in the range (11) for the denominator.

The 1990-2000 asthma mortality rates for New Hampshire adults 35-64 and ≥65 were higher than Healthy People 2010 target rates for these age groups. Relatively high asthma mortality rates among older adults may be partly due to the difficulty of distinguishing asthma from other chronic lung diseases in persons 35 and older.

CONCLUSIONS

Asthma is an important and growing public health problem in the United States. Data from the 2001 Behavioral Risk Factor Surveillance System indicate that 8.4% of New Hampshire adults currently have asthma. This report summarizes data on asthma prevalence, morbidity, and mortality in New Hampshire from existing sources such as the BRFSS and vital records. The information contained in this report is the most comprehensive picture of asthma in New Hampshire to date. It represents a baseline of information that can be used to monitor asthma trends over time and evaluate efforts to reduce the burden of asthma in the state.

Future reports on asthma in New Hampshire will include additional data from these and other sources. For example, New Hampshire began including the Adult Asthma History and Childhood Asthma modules in its BRFSS survey in 2002. Results from these questions will provide a new source of information on health care utilization, attack prevalence, number of school or work days missed, activity limitations, and medication use among persons with asthma in the state. Forthcoming analyses of hospital discharge data will explore topics such as repeat hospitalizations and emergency department visits, the frequency of asthma-related procedures (e.g., intubation), and the geographic distribution of hospitalizations.

Additional analyses may also be able to elucidate the dynamics behind some of the findings of this report: for example, the shift from higher hospitalization and emergency department rates in males to higher rates in females that occurs after age 15, and the decline in hospitalization rates among children less than 5 years of age that occurred from 1996 to 2000. In addition, analysis of the distribution of hospitalization charges by payor, stratified by age and gender, may reveal some important characteristics of the self-pay and Medicare payment groups.

The Asthma Control Program is currently working to expand its surveillance system to track asthma illness and disability, asthma prevalence in children, the impact of environmental factors on asthma, asthma management, access to care, and health care utilization among persons with asthma. Data from new sources like Medicaid, Medicare, private insurers, indoor and outdoor air quality monitoring projects, and school asthma surveys should be available within the next couple of years. These efforts to develop new, and enhance existing, asthma surveillance activities represent an exciting opportunity to increase our understanding of asthma in New Hampshire.

REFERENCES

1. US Department of Health and Human Services. Respiratory diseases [Goal 24]. In: Healthy People 2010. Washington, DC: US Department of Health and Human Services, 2000.
2. Mannino DM, Homa DM, Akinbami LJ, et al. Surveillance for asthma—United States, 1980-1999. In: CDC Surveillance Summaries, March 29, 2002. MMWR 2002;51(No. SS-1):1-13.
3. Behavioral Risk Factor Surveillance System, 2000. Survey data, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, U.S. Department of Health and Human Services. Available at: <http://www.cdc.gov/brfss/index.htm>.
4. Asthma and Allergy Foundation of America. Cost of asthma in the United States. Available at: <http://www.aafa.org/templ/display.cfm?id=67>. Accessed January 2003.
5. National Institutes of Health, National Asthma Education Program. Expert Panel Report 2: guidelines for the diagnosis and management of asthma. Bethesda, MD: National Institutes of Health, National Heart, Lung, and Blood Institute, 1993; 1-153.
6. Lengerich EJ (ed). Indicators for chronic disease surveillance: consensus of CSTE, ASTCDPD, and CDC. Atlanta, GA: Council of State and Territorial Epidemiologists, November 1999.
7. Behavioral Risk Factor Surveillance System, 2000. Survey data, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, U.S. Department of Health and Human Services. Available at: <http://www.cdc.gov/brfss/index.htm>.
8. Mannino DM, Homa DM, Akinbami LJ, et al. Surveillance for asthma—United States, 1980-1999. In: CDC Surveillance Summaries, March 29, 2002. MMWR 2002;51(No. SS-1):1-13.
9. Weiss KB, Sullivan SD, Lyttle CS. Trends in the cost of illness for asthma in the United States, 1985-1994. J Allergy Clin Immunol 2000;106:493-9.
10. Centers for Disease Control and Prevention. Council of State and Territorial Epidemiologists, asthma surveillance definition. Atlanta, GA: U.S. Department of Health and Human Services, CDC, National Center for Environmental Health, 2001.
11. National Center for Health Statistics. Asthma prevalence, health care use and mortality, 2000-2001. Available at: <http://www.cdc.gov/nchs/products/pubs/pubd/hestats/asthma/asthma.htm>.
12. New York City Department of Health, New York City Childhood Asthma Initiative. Asthma facts. Available at: <http://www.ci.nyc.ny.us/html/doh/html/asthma/asthma.html>.
13. US Department of Health and Human Services. Healthy people 2010 (conference ed, 2 vols). Washington, DC: US Department of Health and Human Services, 2000.
14. New Hampshire Department of Health and Human Services. Healthy New Hampshire 2010. Concord, NH: New Hampshire Department of Health and Human Services, 2001.
15. Michigan Department of Community Health. Epidemiology of asthma fact sheet. January, 2001.
16. Nebraska Health and Human Services System. Nebraska epidemiology report. Asthma in Nebraska, 1987-1998. March, 2001.
17. American Academy of Allergy, Asthma, and Immunology. National asthma training curriculum (unpublished draft).
18. Weiss KB, Sullivan SD, Lyttle CS. Trends in the cost of illness for asthma in the United States, 1985-1994. J Allergy Clin Immunol 2000;106:493-9.

19. Asthma and Allergy Foundation of America. Cost of asthma in the United States. Available at: <http://www.aafa.org/templ/display.cfm?id=67>. Accessed January 2003.
20. US Department of Health and Human Services. Respiratory diseases [Goal 24]. In: Healthy People 2010. Washington, DC: US Department of Health and Human Services, 2000.
21. National Center for Health Statistics. Asthma prevalence, health care use and mortality, 2000-2001. Available at: <http://www.cdc.gov/nchs/products/pubs/pubd/hestats/asthma/asthma.htm>.
22. Weiss KB, Sullivan SD, Lyttle CS. Trends in the cost of illness for asthma in the United States, 1985-1994. *J Allergy Clin Immunol* 2000;106:493-9.
23. American Academy of Allergy, Asthma, and Immunology. National asthma training curriculum. Asthma surveillance fact sheet (unpublished draft).
24. Mannino DM, Homa DM, Akinbami LJ, et al. Surveillance for asthma—United States, 1980-1999. In: CDC Surveillance Summaries, March 29, 2002. *MMWR* 2002;51(No. SS-1):1-13.
25. Mannino DM, Homa DM, Akinbami LJ, et al. Surveillance for asthma—United States, 1980-1999. In: CDC Surveillance Summaries, March 29, 2002. *MMWR* 2002;51(No. SS-1):1-13.
26. American Academy of Allergy, Asthma, and Immunology. National asthma training curriculum (unpublished draft).
27. National Center for Health Statistics. Asthma prevalence, health care use and mortality, 2000-2001. Available at: <http://www.cdc.gov/nchs/products/pubs/pubd/hestats/asthma/asthma.htm>.
28. American Academy of Allergy, Asthma, and Immunology. National asthma training curriculum (unpublished draft).
29. Mannino DM, Homa DM, Akinbami LJ, et al. Surveillance for asthma—United States, 1980-1999. In: CDC Surveillance Summaries, March 29, 2002. *MMWR* 2002;51(No. SS-1):1-13.

APPENDIX A: SUPPLEMENTAL TABLES

Table 28. Respondents ever told they had asthma, by sex, age, income, and education—New Hampshire BRFSS, 2000 & 2001

Demographic	2000		2001	
	Number	% (95% CI)	Number	% (95% CI)
Overall	239	12.0 (10.3,13.7)	481	12.5 (11.3,13.7)
Sex				
Male	82	10.7 (8.2,13.2)	176	11.6 (9.7,13.4)
Female	157	13.2 (11.0,15.5)	305	13.3 (11.8,14.9)
Age				
18-24	16	12.5 (6.3,18.7)	47	17.7 (12.7,22.7)
25-34	49	14.5 (10.0,18.9)	109	17.2 (13.9,20.6)
35-44	53	10.2 (7.3,13.1)	104	10.4 (8.3,12.5)
45-54	63	15.7 (11.6,19.8)	82	9.5 (7.3,11.7)
55-64	26	9.8 (5.9,13.6)	76	14.0 (10.9,17.2)
65 and older	31	9.0 (5.7,12.2)	56	8.0 (5.8,10.2)
Income				
Less than \$20,000	31	13.0 (8.0,18.0)	58	12.0 (8.7,15.3)
\$20,000-\$34,999	54	13.8 (9.8,17.8)	85	11.7 (9.1,14.3)
\$35,000-\$49,999	42	11.1 (7.4,14.8)	72	11.3 (8.4,14.2)
\$50,000-\$74,999	44	12.7 (8.8,16.6)	99	14.7 (11.5,17.9)
\$75,000 and higher	33	8.7 (5.5,11.9)	107	12.9 (10.4,15.4)
Education				
Less than HS graduate	21	12.9 (6.7,19.0)	39	13.7 (8.9,18.4)
HS diploma or GED	58	9.9 (7.0,12.8)	128	11.1 (9.1,13.1)
Some college	77	14.1 (10.8,17.5)	137	13.8 (11.2,16.3)
College graduate	83	11.8 (9.1,14.6)	176	12.5 (10.5,14.5)

Notes:

15.4% and 13.9% of respondents had missing data for income in 2000 and 2001, respectively.

Excludes "Don't Know/Not Sure" and "Refused" responses.

N=number of respondents in answer category for each demographic group (unweighted sample size).

Percentages and 95% CIs are based on weighted data.

See Appendix B for exact wording of survey questions used

Source: Behavioral Risk Factor Surveillance System, 2000 & 2001. Survey data, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, U.S. Department of Health and Human Services. NH BRFSS Data provided by the NH Dept. of Health and Human Services, Bureau of Health Statistics and Data Management..

Table 29. Respondents answering ‘yes’ to the question ‘Do you still have asthma?’, by sex, age, income, and education—New Hampshire BRFSS, 2001

Demographic	Number	Percent (95% CI)
Overall	339	69.5 (64.4,74.5)
Sex		
Male	108	59.9 (51.2,68.6)
Female	231	77.4 (72.1,82.7)
Age		
18-24	28	N/A
25-34	74	65.5 (54.6,76.4)
35-44	73	67.2 (56.7,77.7)
45-54	59	73.4 (62.1,84.8)
55-64	59	77.6 (67.2,87.9)
65 and older	43	81.9 (71.8,91.9)
Income		
Less than \$20,000	48	79.2 (66.9,91.4)
\$20,000-\$34,999	56	63.9 (52.0,75.7)
\$35,000-\$49,999	53	75.4 (63.9,87.0)
\$50,000-\$74,999	71	71.4 (59.1,83.6)
\$75,000 and higher	67	63.5 (53.3,73.7)
Education		
Less than HS graduate	34	N/A
HS diploma or GED	91	69.1 (60.0,78.2)
Some college	94	68.1 (58.2,78.0)
College graduate	119	68.5 (60.3,76.7)

Notes:

Only people who reported ever being told they had asthma were asked this question.

13.9% of respondents had missing data for income in 2001.

Excludes “Don’t Know/Not Sure” and “Refused” responses.

N=number of respondents in answer category for each demographic group (unweighted sample size).

Percentages and 95% CIs are based on weighted data.

N/A: Too few respondents were included to calculate reliable estimates.

Source: Behavioral Risk Factor Surveillance System, 2001. Survey data, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, U.S. Department of Health and Human Services. NH BRFSS Data provided by the NH Dept. of Health and Human Services, Bureau of Health Statistics and Data Management..

Table 30. Respondents ever told child had asthma, by age, income, and education—New Hampshire BRFSS, 2000 & 2001

Demographic	2000		2001	
	Number	% (95% CI)	Number	% (95% CI)
Overall	250	12.6 (11.1,14.3)	273	17.5 (15.3,19.6)
Age				
18-24	N/A	0	7	6.4 (1.3,11.6)
25-34	28	9.5 (5.8,13.2)	70	19.4 (14.8,24.0)
35-44	81	16.2 (12.7,19.7)	142	20.1 (16.8,23.4)
45-54	74	20.0 (15.3,24.6)	43	16.5 (11.6,21.4)
55-64	40	17.5 (12.3,22.7)	6	N/A
65 and older	26	9.2 (5.6,12.8)	2	N/A
Income				
Less than \$20,000	31	16.5 (10.4,22.6)	21	23.5 (13.3,33.8)
\$20,000-\$34,999	61	13.6 (10.0,17.1)	36	12.8 (8.5,17.1)
\$35,000-\$49,999	33	10.0 (6.5,13.6)	48	17.8 (12.5,23.2)
\$50,000-\$74,999	52	15.2 (10.9,19.4)	75	24.5 (19.0,29.9)
\$75,000 and higher	57	14.9 (11.0,18.9)	64	14.2 (10.5,17.9)
Education				
Less than HS graduate	26	18.2 (11.1,25.3)	17	15.3 (7.8,22.8)
HS diploma or GED	69	12.4 (9.3,15.5)	78	15.3 (11.8,18.7)
Some college	81	13.7 (10.6,16.8)	87	23.1 (18.1,28.1)
College graduate	74	10.6 (8.1,13.2)	91	15.7 (12.5,18.8)

Notes:

Only people who reported that at least one child 17 or younger lived in their household were asked this question. 15.4% and 13.9% of respondents had missing data for income in 2000 and 2001, respectively.

Excludes "Don't Know/Not Sure" and "Refused" responses.

N= number of respondents in answer category for each demographic group (unweighted sample size).

Percentages and 95% CIs are based on weighted data.

N/A: Too few respondents were included to calculate reliable estimates.

See Appendix B for exact wording of survey questions used.

Source: Behavioral Risk Factor Surveillance System, 2000 & 2001. Survey data, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, U.S. Department of Health and Human Services. NH BRFSS Data provided by the NH Dept. of Health and Human Services, Bureau of Health Statistics and Data Management..

APPENDIX B: NEW HAMPSHIRE BEHAVIORAL RISK FACTOR SURVEILLANCE SYSTEM ASTHMA QUESTIONS

Adult Asthma

2000 BRFSS:

1. Did a doctor ever tell you that you had asthma?
 - a. Yes
 - b. No
 - c. Don't know/Not sure
 - d. Refused
2. Do you still have asthma?
 - a. Yes
 - b. No
 - c. Don't know/Not sure
 - d. Refused

2001 BRFSS:

1. Have you ever been told by a doctor, nurse, or other health professional that you had asthma?
 - a. Yes
 - b. No
 - c. Don't know/Not sure
 - d. Refused
2. Do you still have asthma?
 - a. Yes
 - b. No
 - c. Don't know/Not sure
 - d. Refused

Childhood Asthma

2000 BRFSS:

1. Did a doctor ever tell you that a child of yours has asthma?
 - a. Yes
 - b. No
 - c. Don't know/Not sure
 - d. Refused
2. Does your child take medication for his/her asthma?
 - a. Yes
 - b. No
 - c. Don't know/Not sure
 - d. Refused

2001 BRFSS:

1. Earlier you said there were (#) children age 17 or younger living in your household. How many of these children have (or has this child) ever been diagnosed with asthma?
2. How many of these children still have asthma?

APPENDIX C: HEALTHY PEOPLE 2010 AND HEALTHY NEW HAMPSHIRE 2010 OBJECTIVES FOR ASTHMA

Healthy People 2010 Objectives

- 24-1. Reduce asthma deaths
 - From 2.1 per million to 1.0 per million in children less than 5 years of age
 - From 3.3 per million to 1.0 per million in children 5 to 14 years of age
 - From 5.0 per million to 3.0 per million in persons 15 to 34 years of age
 - From 17.8 per million to 9.0 per million in persons 35 to 64 years of age
 - From 86.3 per million to 60.0 per million in persons 65 years of age and older
- 24-2. Reduce hospitalizations for asthma
 - From 45.6 per 10,000 to 25 per 10,000 in children less than 5 years of age
 - From 12.5 per 10,000 to 7.7 per 10,000 in persons 5 to 64 years of age
 - From 17.7 per 10,000 to 11.0 per 10,000 in persons 65 years of age and older
- 24-3. Reduce hospital emergency department visits for asthma
 - From 150.0 per 10,000 to 80 per 10,000 in children less than 5 years of age
 - From 71.1 per 10,000 to 50 per 10,000 in persons 5 to 64 years of age
 - From 29.5 per 10,000 to 15 per 10,000 in persons 65 years of age and older
- 24-4. Reduce activity limitations among persons with asthma from a 1994-1996 baseline level of 20% to 10% by 2010.
- 24-5. Reduce the number of school or work days missed by persons with asthma due to asthma. (Developmental)
- 24-6. Increase the proportion of persons with asthma who receive formal patient education, including information about community and self-help resources, as an essential part of the management of their condition from a 1998 baseline level of 8.4% to 30% by 2010. (Developmental)
- 24-7. Increase the proportion of persons with asthma who receive appropriate asthma care according to the NAEPP Guidelines. (Developmental)
- 24-8. Establish in at least 25 states a surveillance system for tracking asthma death, illness, disability, impact of occupational and environmental factors on asthma, access to medical care, and asthma management. (Developmental)

Healthy New Hampshire 2010 Objective

Reduce hospitalizations for pediatric asthma (0 to 17 years of age) from a 1998 baseline level of 10.5 per 10,000 to 7.9 per 10,000 by 2010.